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South Mountain Area Transportation Master Plan Study

Class Environmental Study Report

Volume 1 - Main Report

City of Hamilton/Region of Hamilton-Wentworth
Predesign & Special Projects Office,
Roads Department

May, 2000

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Public Review of the Environmental Study Report

This ESR has been filed for a thirty (30) day public review period at the following locations:

- Clerk's Office
  City of Hamilton / Region of Hamilton-Wentworth, 2nd Floor, City Hall
- Ministry of the Environment
  West Central Region
  119 King Street West, 12th Floor
- Central Library
  55 York Boulevard
- Concession Library
  555 Concession Street
- Terryberry Library
  100 Mohawk Road West
- Sherwood Library
  462 Upper Ottawa Street

The public has been notified of the review period by an advertisement in the Hamilton Spectator and in the Hamilton Mountain News.

The thirty (30) day review period is from May 17 to June 15, 2000. If, after reading the ESR, you have questions or concerns please follow this procedure:

1. Contact the following to discuss your questions or concerns.

   Gavin Norman, Project Manager, (905) 546-2433, or
   Chris Murray, Manager of Environmental Planning, (905) 546-2486
   Predesign and Special Projects Office
   77 James Street North, Suite 320
   Hamilton, ON L8R 2K3

2. Arrange a meeting with the above staff if you have significant concerns that may require more detailed explanation.
3. If you raise major concerns, the City / Region will attempt to negotiate a resolution of the issues. A mutually acceptable time period for this negotiation will be set. If, at the end of this period, the issues remain unresolved, you may request the Minister of the Environment, by order, to require the City/Region to comply with Part II of the Environmental Assessment Act before proceeding with the project. This is called a Part II Order. The Minister will make one of the following decisions:
   - deny the request
   - refer the matter to mediation
   - require the City/Region to comply with Part II of the Environmental Assessment Act by undertaking one of the following:
     - submitting the ESR for government review and approval, or
     - completing an individual Environmental Assessment for government review and approval, or
     - preparing Terms of Reference governing the preparation of an individual Environmental Assessment.

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1.0 Environmental Study Report (ESR)

This Environmental Study Report (ESR) documents the planning process that was used by the City of Hamilton/Region of Hamilton-Wentworth (hereinafter referred to as the "Municipality") to develop the recommended South Mountain Area Transportation Master Plan. The Plan outlines the changes that are required to the major road network in the South Mountain Area over the next 20 years.

All municipalities are required to comply with the Environmental Assessment Act (EA Act). The requirements of the EA Act can be met by following the planning process outlined in the document "Class Environmental Assessment for Municipal Road Projects" published by the Municipal Engineers Association. For this Master Plan study, the City/Region satisfied the first two phases of the five phase Class EA process (i.e., the problem / opportunity identification and alternative solutions).

This ESR was developed to ensure that potential impacts were considered as part of the decision-making process and includes the following:

- the background to the project and previous studies that influenced the purpose and planning for the project;
- the master planning process;
- the project participants and how their concerns affected the project;
- the existing environmental conditions including the natural, cultural, economic, social and transportation environment;
- the planning alternatives, the evaluation and the preferred solution; and
- a description of the Recommended Plan, including its implementation.

1.1 Study Purpose

The purpose of the South Mountain Transportation Master Plan is to guide the construction of transportation infrastructure over the next twenty years. The study was initiated for several reasons:

- To understand the impact and identify improvements that need to be made to the major road network in the South Mountain Area as a result of both:

  changed traffic patterns that followed the opening of the Lincoln M. Alexander Parkway ("Linc") in October 1997; and

  expected growth in the South Mountain Area and adjacent communities in Stoney Creek and Ancaster

- To develop a comprehensive transportation plan that sets project scope and priority in order to coordinate scheduling and budgeting.
- To investigate opportunities to promote the transportation objectives of Vision 2020 that aim at less reliance on the automobile and more support of sustainable forms of transportation such as transit, cycling and walking.

1.2 Study Team

The study was carried out by the Predesign and Special Projects Office (SPO), Transportation, Operations and Environment Division, City of Hamilton / Regional Municipality of Hamilton-Wentworth. SPO was responsible for coordinating all aspects of the study. For the purpose of providing integrated decision making, a Study Team was assembled comprising the following staff within the organization:

• Gavin Norman	Project Manager (SPO)
• Ray Smith	Environmental Planner (SPO)
• John van der Mark	Director (SPO)
• Gary Moore	Manager of Engineering (SPO)
• Chris Murray	Manager of Environmental Planning (SPO)
• Ted Gill	Senior Director, Roads
• Hart Solomon	Manager, Traffic Engineering and Operations
• Vince Zingaro	Project Manager, Right-of-Way, Roads
• Bill Janssen	Manager, Community Initiatives (Community Planning and Development)

This Study Team met at key decision points to assess study findings and set direction based on information developed by SPO and results of public consultation.

1.3 The Study Area

The study area consists of two parts (see Exhibit 1.1):

- A primary study area that is the focus of the investigations due to growth in residential and commercial developments on the Mountain and the changed traffic patterns resulting from the opening of the Linc.

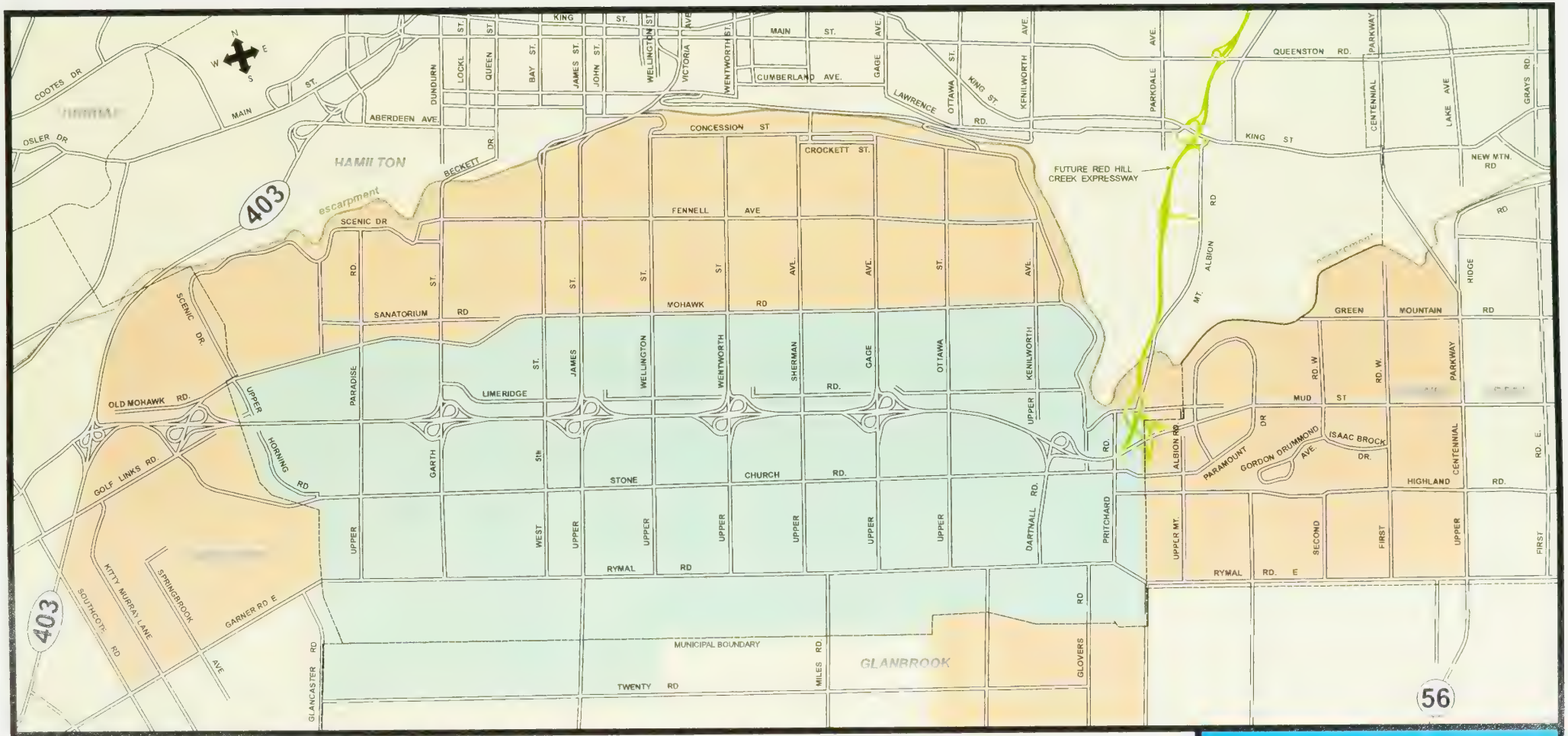
  The primary area is bounded by Mohawk Road, the municipal boundaries with Stoney Creek and Ancaster, and the south urban boundary that is both within Glanbrook and follows the municipal boundary.

- A larger secondary study area considered in the analysis of trip making and traffic flows.

  This area is bounded by the Niagara Escarpment, the municipal boundaries within Stoney Creek and Glanbrook, and Highway 403.

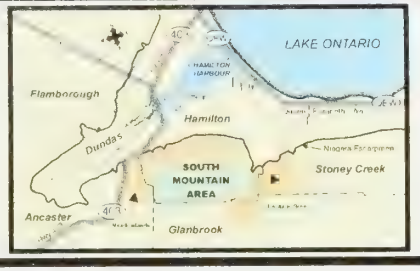
1.4 Background and Related Studies

There are a number of policy documents, land use and transportation plans that were used to guide the development of this Master Plan and the specific projects that will result:



SOUTH MOUNTAIN AREA TRANSPORTATION MASTER PLAN STUDY

Exhibit 1.1



Primary Study Area

Secondary Study Area

STUDY AREA

- *Vision 2020*

  Approved by Regional Council in 1993, the broad set of detailed strategies and actions that comprise Vision 2020 are aimed at improving the sustainability of new development and the long-term quality of life for the community of Hamilton-Wentworth. In 1998, Regional Council renewed its support for Vision 2020 and adopted a set of revised and new strategies. Many of the action strategies included in the 1993 and 1998 Vision 2020 documents reflect support for a sustainable transportation system.

- *The Regional Transportation Review*

  Approved in 1996, the Regional Transportation Review (RTR) identifies a long-range transportation development plan and implementation strategy for the Region. The RTR includes:

  - a road network plan which will help guide this Transportation Master Plan;
  - a public transit concept plan which will complement the Transportation Master Plan;
  - a continuation of implementing the Bicycle Master Plan and an overall concept plan for the Central Area (A Cycling Master Plan has been developed and its proposals will complement this Transportation Master Plan);
  - a pedestrian and parking plan which will also complement the Transportation Master Plan.

- *The Regional Official Plan*

  Approved in 1995, the Regional Official Plan (ROP) describes in broad terms Regional involvement in the provision of physical services including transportation land use and environmental planning, social and health care and the economy to the year 2020. Since the ROP is a broad policy document, it relies on area municipal plans to develop detailed land use policies and designations.

- *City of Hamilton Official Plan and Neighbourhood Plans*

  The City of Hamilton Official Plan is a comprehensive guide to coordinate public and private actions in an orderly manner by defining future relationships among land uses and municipal services. Neighbourhood Plans are land use plans prepared for specific areas of the City to guide future development and redevelopment. In the South Mountain study area, there are 42 neighbourhood plans that must be considered.

- *Red Hill Creek Watershed Action Plan*

  Approved in 1998, the Red Hill Creek Watershed Action Plan provides goals, objectives and general guidance for land and infrastructure development, conservation, restoration and rehabilitation efforts within the Watershed. Approximately 70% of the South Mountain Area falls within this Watershed boundary.

- *Bicycle Network Study*

  The focus of the 1992 Bicycle Network Study was to establish the basis for a utilitarian bikeway network that could be implemented efficiently and effectively. A five-year implementation schedule identified a number of infrastructure improvements including the Escarpment Rail Trail – Wentworth Street to Arbour Road on the South Mountain.

- *Shifting Gears: A New Cycling Plan for Hamilton-Wentworth*

  Completed in 1999, this Action Plan updated the aforementioned 1992 Bicycle Network Study. The focus of this Action Plan was on the provision of safe cycling facilities through selective retrofitting of on-street routes, local improvements and further trail development. The Action Plan also outlined an infrastructure capital improvement program for the 1999-2008 time period.

2.0 Class Environmental Assessment and Master Planning Approach

The Transportation Master Plan study documented in this Environmental Study Report (ESR) followed a provincially approved planning process as per the "Class Environmental Assessment for Municipal Road Projects, 1993" (Class EA). As a Master Plan Study, it is considered a Schedule 'B' Class EA and is required to satisfy Phases 1 and 2 of the Class EA process. As such it will follow a planning process that incorporates the following Environmental Assessment principles:

- public consultation early in the planning process so that decision making is cooperative;
- identification and review of a reasonable range of alternatives;
- identification and consideration of the effects of each alternative on all aspects of the environment;
- evaluation of advantages and disadvantages of identified alternatives to determine their net environmental effects;
- selection of a Recommended Plan; and
- implementation and monitoring of a Recommended Plan.

2.1 The Master Plan Process

This Plan is intended to guide the orderly, long-term development of the transportation network in an effective and economical manner. The Plan will provide direction for the planning and implementation of roads, transit, pedestrian and bicycle facilities. The Plan will guide the construction of infrastructure through consideration of future travel demand within the South Mountain Area ("SMA") that reflects community values and respect for the environment.

> "Municipal Transportation Master Plans are a means for a municipality to integrate environmental considerations into transportation and land use planning. By defining the long range transportation needs of a community in relation to land use planning as defined by the Official Plan, a Municipal Transportation Master Plan can reduce the need for works required to deal with the impacts of change due to growth. A comprehensive approach represents an opportunity to promote consistency between transportation planning and environmental assessment requirements."
>
> Source: Class Environmental Assessment for Municipal Road Projects, 1993.

2.2 Consultation

Consultation is a fundamental tenet of Class Environmental Assessment. Its purpose in the process is to:

> "...generate meaningful dialogue between the project planners and the public, allowing an exchange of ideas and the broadening of the information base, ... leading to better decision making."
>
> Source: Class Environmental Assessment for Municipal Road Projects, 1993.

During the Study, the Study Team consulted with four groups:

- External Agencies (typically government ministries, other municipalities, utility companies etc., potentially affected by the proposed undertaking);
- City of Hamilton/Region of Hamilton-Wentworth Staff;
- Council; and
- the Public.

The Plan itself was focused around public meetings occurring at key points in the study. Initially, pertinent external agencies and internal staff were identified and contacted regarding their expected level of involvement in the study. Council involvement occurred at two levels: informally by way of meetings with local Aldermen and formally through presentations of final recommendations to Transportation Services Committee (TSC) and Regional Council.

2.2.1 External Agency Involvement

Involvement of potentially affected government ministries and agencies was limited as most only required information regarding the study, its progress and the final recommendations. This information was mailed to all external agencies that requested some level of involvement. In addition, all external agencies were invited to public meetings to review and comment on the information being presented.

From the perspective of the Study process, only the Ministry of the Environment (MOE), West Central Region branch and the Ministry of Citizenship, Culture and Recreation were actively involved.

Documentation of external agency involvement is included in Appendix 'B'.

2.2.2 Internal Staff Involvement

Key internal staff was directly involved in the study as Study Team members. Similar to external agencies, most internal staff members requested information regarding the progress of the study and its final recommendations. Staff from the Planning Department attended public meetings to respond to questions.

Documentation of internal staff involvement is included in Appendix 'B'.

2.2.3 Council Involvement

As noted Council involvement was both informal and formal. Informally, it consisted of participation from local Aldermen of Ward 6, 7 and 8, throughout the study to review key issues, study findings and information being presented at the public meetings. Four meetings were facilitated with this group at key points in the study and were also used as a tool to gain insight into the concerns of constituents.

At the conclusion of the study, recommendations were formally presented to the Transportation Services Committee (TSC) and subsequently Regional Council for endorsement.

Documentation of Council involvement is included in Appendix 'B'.

2.2.4 Public Involvement

A major component of the consultation plan was involvement of the public. In order to solicit participation, two public meetings were held at key points in the study:

First Set of Public Meetings:	November 3 and 4, 1999
	Identification of Problems and Opportunities
Second Set of Public Meetings:	February 16 and 17, 2000
	Identification of Alternatives and the Preferred Solution

The Public Meetings were advertised in the newspaper, on local radio broadcasts and on the Regional web site.

At the Meetings, the public was given the opportunity to discuss, ask questions and comment on the study findings with staff members. Information at each meeting was presented on display panels and available in booklet form. Comment sheets, which included a questionnaire, were also made available. Mailing addresses of attendees were recorded for future notice of subsequent opportunities for input.

The consultation plan concluded with a 30-day public review of the Environmental Study Report as mandated by the Class EA process.

Documentation of public involvement is included in Appendix 'B'.

3.0 Description of Existing and Future Conditions

The purpose of this section is to describe the existing and future environment within the study area. Based on this future review, the potential effects of the various transportation alternatives can then be identified. Environmental conditions that will be described include natural, cultural, socio-economic and transportation components.

3.1 Overview of Environmental Conditions within the Study Area

The South Mountain study area (described in Section 1.6) has been largely developed. With the exception of small parcels of undeveloped lands in the southern and western sections (designated in the Official Plan for residential, commercial and industrial development), this landscape is completely urbanized. Most of the study area is located within the Red Hill Creek Watershed. Natural areas in the watershed consist of highly fragmented remnants of the original forest and wetlands. Above the Escarpment, this drainage system has been channellized and piped to facilitate storm water drainage from the urbanized landscape.

Neighbourhood and Secondary Plans have not traditionally incorporated environmental features into the design of communities. The overall result is that the South Mountain area lacks significant natural features that would constrain improvements to the transportation network. There are no significant fish or wildlife habitats, no Areas of Natural and Scientific Interest and only one Provincially Significant Wetland of which only a small section is within the study area.

In summary, the Red Hill Creek Watershed Plan (October 1997) documented the relative absence of natural environmental features within the study area, therefore, no comprehensive field inventory was considered necessary. Rather, the residual natural features (chiefly roadside vegetation, cultural features and land use characteristics), located adjacent to roads subject to potential improvements were identified and evaluated for significance and sensitivity.

3.2 Natural Environment (refer to Exhibit 3.1)

Overall, the natural environment within the South Mountain study area has been largely supplanted by urban development. What little evidence of the natural ecosystem that remains is restricted to a few highly fragmented pockets of forest, some remnant hedgerows and some intermittent tributaries of Red Hill Creek.

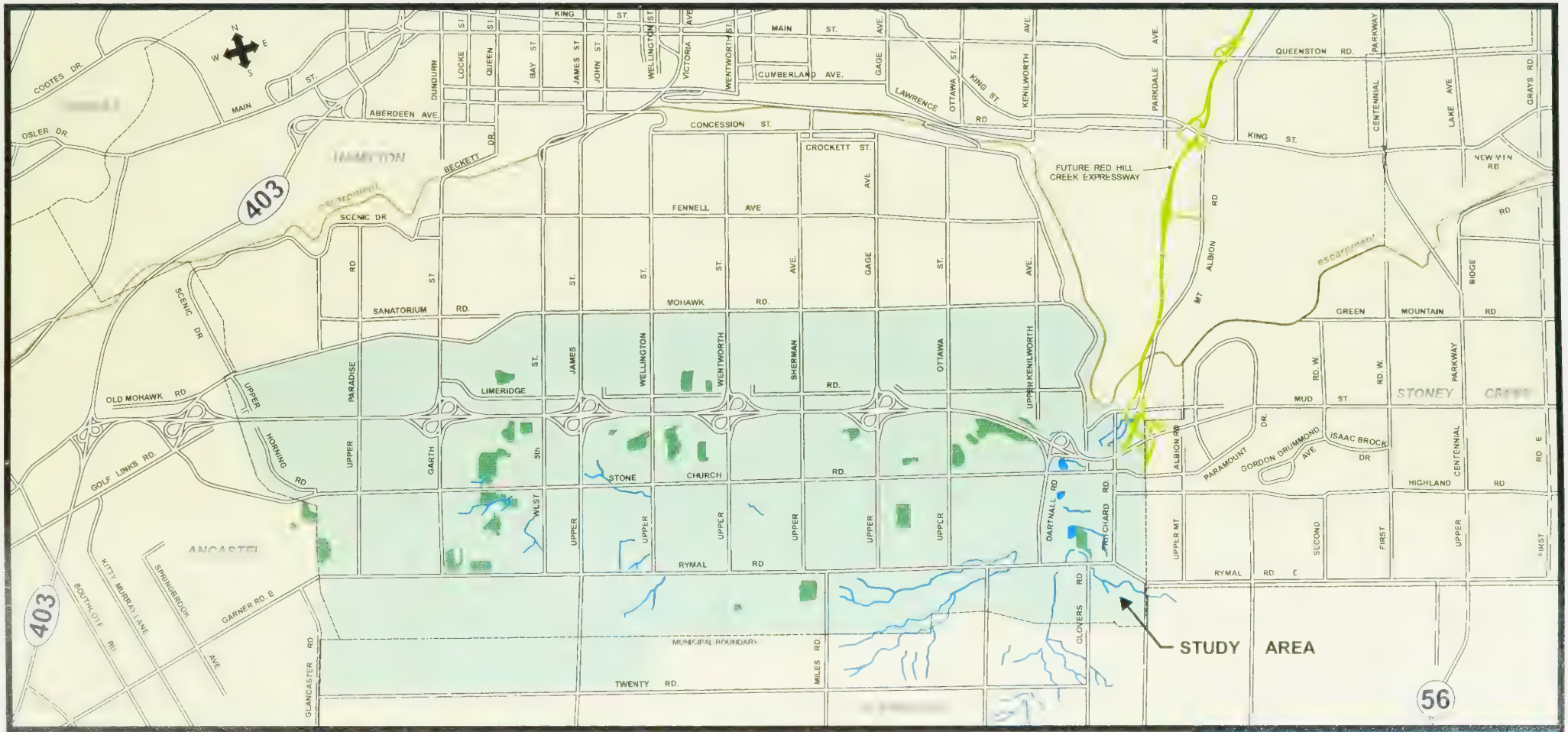
3.2.1 Physiography and Topography

The study area is located within the physiographic unit known as the Haldimand Clay Plain.

The overall topographic character of the landscape is gently undulating. The topographic surface rises from north to south. An average elevation at Mohawk Road and Upper Wentworth Street is ±210m above mean sea level (msl), while an average elevation at Rymal Road and Upper Wentworth Street increases to ±217m msl. Similarly the topography also rises from east to west. An average elevation at Upper Gage Avenue and Stone Church Road is ±218 m msl while at Garth Street and Stone Church Road the average elevation is 234m msl.

3.2.2 Geology and Soils

Dolostone bedrock of Silurian Age lies at depths typically less than 5m but locally up to 15m. In some locations within the southeastern part of the study area, bedrock is encountered less than 1m from the surface.



SOUTH MOUNTAIN AREA TRANSPORTATION MASTER PLAN STUDY

Exhibit 3.1

Natural Forested Area

Intermittent Watercourses

NATURAL ENVIRONMENT

Soils are predominately clay and clay till with local deposits of silt at the southwest limits of the study area. Typically there is not much soil erosion except where there are silt and fine sand deposits. Slopes are stable except where subjected to active erosion by water flow in Red Hill Creek.

3.2.3 Surface Water Drainage

The study area is located within three watersheds—Red Hill Creek, Chedoke Creek and Twenty Mile Creek. The majority of the area is within the Red Hill Creek watershed, which is comprised of the Green Hill, Upper Ottawa and Hannon Creek sub-watersheds.

The Green Hill sub-watershed, which includes a small area south of Mohawk Road in the north-central part of the study area, is completely drained by engineered systems.

The Upper Ottawa sub-watershed which includes the majority of the study area has approximately 65% urban / engineered drainage and 35% 'natural' drainage. As urbanization of this sub-watershed proceeds, the 'natural' drainage component continues to diminish.

The Hannon Creek sub-watershed is the least urbanized part of the study area. This sub-watershed has 25% engineered drainage and 75% natural drainage.

The extreme western sector of the study area is drained by Chedoke Creek. The drainage of this area is completely engineered. No natural watercourse remains.

The extreme southwest sector of the study area is drained by the headwaters of Twenty Mile Creek. The drainage of the area has been completely engineered. No natural watercourse remains.

No water quality studies have been undertaken for the three sub-watersheds of Red Hill Creek within the study area. However, based on water quality information collected and analyzed for locations on Red Hill Creek, downstream of the study area, the following water quality characterization has been identified:

- human activity has had a significant impact on water quality within the Red Hill Creek watershed
- excessive nutrient enrichment has been observed through high levels of phosphorous, ammonia and nitrogen and nuisance algae growth
- bacteria levels are high during all flow conditions
- annual pollutant loading to the creek above Queenston Road is mainly due to storm water runoff from residential and industrial land uses.

3.2.4 Fisheries

Fisheries resources within the study area are limited by water quality conditions, intermittent flow and degraded habitat. In the portion of Red Hill Creek, which lies above Albion Falls, four fish species have disappeared since 1985. Only Brook Sticklebacks and Goldfish have been captured in recent years. The intermittent nature of the few discontinuous natural stream course stretches of Red Hill Creek within the study area severely limits the development of a significant fish community.

3.2.5 Vegetation and Wildlife

Natural areas in the study area consist of highly fragmented pockets of forest, successional areas and remnant hedgerows. There is only one provincially significant wetland (Tiffany Creek Headwaters) within the study area located at the extreme western limit of the study area.

Historically, agricultural land use cleared the original forest leaving forest cover only at the mid-block between concession roads. Consequently, the few remaining forest systems are typically located in the interior of a development block well removed from the exterior road grid. These forest units are too small to remain ecologically viable.

Except for a report of nationally rare Hill's Oak and related savannah species in the vicinity of Stone Church Road near Upper Wellington Street (Dougan & Associates, 1997) no significant vegetation communities have been documented in the study area.

Wildlife documentation within the study area is limited. Based on the paucity of habitat and its highly fragmented nature, wildlife resources are expected to be limited to common avian and mammalian species adapted to urban conditions.

No rare or endangered species have been reported in the study area.

3.2.6 Environmental Land Use Designations

Within the study area, there are two areas designated as Environmentally Significant Areas (ESA) by the Region of Hamilton-Wentworth:

- The Mount Albion Conservation Area – Red Hill Creek ESA at the east end of the study area.
- Tiffany Creek Headwaters ESA a small section of which is at the west end of the study area.

3.3 Cultural Environment

3.3.1 Built Environment

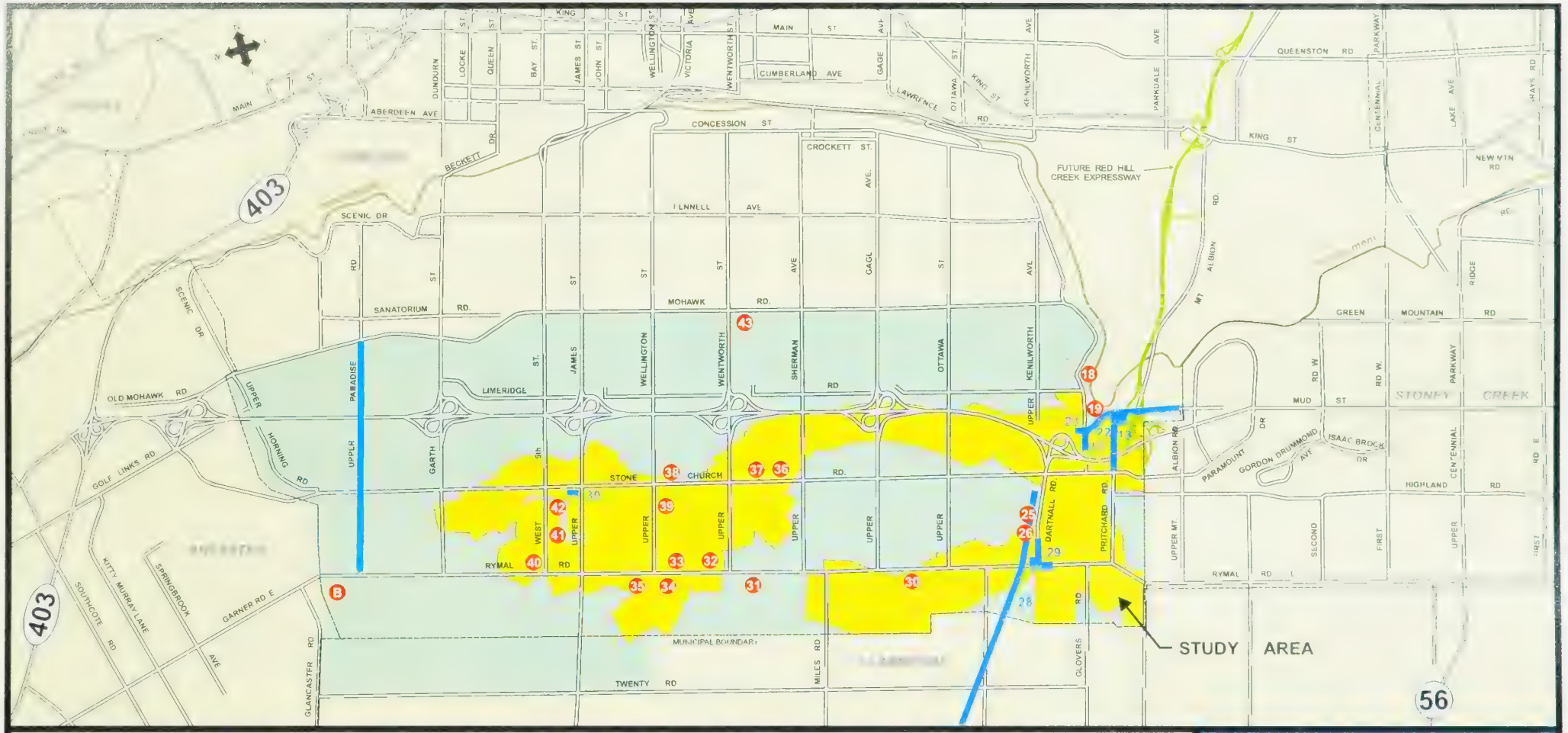
There are a number of built environment features within the study area (Archaeological Services, Inc., December 1997). The location of these heritage features is presented in Exhibit 3.2. A brief description of each built environment feature is provided in Appendix 'E'. Most of these built environment features are located along existing roadways.

3.3.2 Cultural Landscape

A number of cultural landscape units within the study area have also been identified (Archaeological Services, Inc., December 1997). These cultural landscape units are located on Exhibit 3.2 and described in Appendix 'E'.

3.3.3 Archaeology

No comprehensive archaeological inventory of the study area has been completed. However, a considerable number of archaeological sites have been registered (Archaeological Services, Inc., December 1997). Based on known archaeological site locations and environmental parameters, an archaeological site potential model was developed for the Red Hill Creek watershed portion of the study area. This model was used to generate a Zone of Archaeological Potential. This area is depicted on Exhibit 3.2.



SOUTH MOUNTAIN AREA TRANSPORTATION MASTER PLAN STUDY

Exhibit 3.2

Built Heritage Features
(See Appendix E for description)

Cultural Landscape Unit
(See Appendix E for description)

Zone of Archaeological Potential

CULTURAL ENVIRONMENT

3.4 Socio-Economic Environment

The Mountain area has developed rapidly since the late 1960's. The 1996 population and employment base was approximately 135,900 and 30,650 respectively. The 1996 estimated population and employment within the South Mountain was 81,450 and 16,200 respectively.

The number of people living and working in the Mountain area is expected to grow by about 21,850 and 10,700, respectively over the next 20 years. About 90% of this growth is planned for the South Mountain. As this occurs, adjacent communities such as Heritage Green in Stoney Creek and the Meadowlands in Ancaster will also grow in population and employment. Existing and future population and employment data is provided in Table 3.1.

Table 3.1 Existing and Future Population and Employment

	1996 Census	2001 Projected	2021 Projected
Population			
Lower Hamilton	185,118	186,789	186,686
Hamilton Mountain	135,878	145,655	157,742
Stoney Creek	54,321	62,426	86,998
Glanbrook	10,564	11,875	17,155
Dundas	22,736	23,485	25,515
Ancaster	23,320	29,580	43,915
Flamborough	34,517	37,005	54,176
Regional Total	466,454	496,815	572,186
Employment			
Lower Hamilton	110,190	112,159	124,160
Hamilton Mountain	30,646	33,281	41,130
Stoney Creek	17,325	19,852	27,414
Glanbrook	2,285	2,364	5,083
Dundas	7,910	8,054	8,451
Ancaster	7,245	7,761	10,432
Flamborough	8,215	8,901	13,319
Regional Total	**183,816**	**192,372**	**229,989**

3.4.1 Existing and Proposed Land Use

Land use in the study area falls within three jurisdictions:

- City of Hamilton and Region of Hamilton-Wentworth;
- Niagara Escarpment Commission for the area within the Niagara Escarpment Protection Area; and
- Hamilton Region Conservation Authority for regulation of flood plains and areas within the Fill and Construction regulations.

Existing and proposed land uses are shown on Exhibit 3.3 (also refer to the Regional Official Plan and the City of Hamilton Official Plan). Existing (1996) population and employment data for the Region, derived from Census information, was provided by the Regional Planning Department. Land use forecasts were originally developed by Regional Planning as part of the Regional Transportation Review Study (1996) and updated for this study to account for recent changes in land use and changes in assumptions for future growth.

i) Residential

The predominant land use with the South Mountain study area is residential. Beginning in the late 1960's the development pattern on the South Mountain focused on the establishment of separate neighbourhoods. Each neighbourhood had a public / separate and / or high school at the centre surrounded by various subdivisions. Within the study area, there are 43 neighbourhoods. Typically, townhouses are located on the perimeter roads and single family residences are in the interior of the neighbourhood. The overall effect is that the density of development is low. Aside from some apartment development along Mohawk Road, the South Mountain urban development pattern is dispersed and highly dependent on the automobile for transportation access.

St. Elizabeth Village on Rymal Road West is a specialized residential use providing both retirement housing and nursing home facilities.

ii) Commercial / Industrial

Commercial areas are centred on two major locations. The first major concentration is along Upper James Street between Mohawk Road and the City of Hamilton corporate limits south of Rymal Road. The second significant commercial centre is the Limeridge Mall area on Upper Wentworth Street between Mohawk Road and the Linc. Both commercial areas are highly auto-dependent.

Industrial land use is concentrated to the southeast of Upper Ottawa Street in the East Mountain Industrial / Business Park located south of Stone Church Road between Upper Ottawa Street and Pritchard Road. This area permits light industrial and restricted commercial uses.

iii) Institutional

Elementary and secondary schools are located within the interior of many neighbourhoods across the study area. Other institutional uses include churches and retirement homes. Most churches are located along arterial roads such as Mohawk Road, Upper Paradise Road, West 5th Street, Upper Wellington Street and Stone Church Road Retirement homes are spread throughout the study area.

iv) Open Space /Recreational

The neighbourhoods that have school facilities within their interior typically have a neighbourhood park contiguous with the school. These neighbourhood parks are accessible via the local road network.

As well, there are several major City Parks either established or proposed in the study area. These include William Connell Park on West 5th Street south of Stone Church Road, Thomas McQuesten Park on Upper Wentworth Street south of the Linc, the Mount Albion Conservation Area in the Stone Church Road – Dartnall Road area and the Turner Farm Park on Rymal Road East.

3.5 Transportation

3.5.1 Existing Conditions

i) Arterial Road Network

The SMA major transportation system operates on a basic grid network of major and minor arterial roads running north-south and east-west. In general, major arterials are designated with a 36m right-of-way and minor arterials are designated with a 26-30m right-of-way. The only exception to this is Mohawk Road at 30m.

The full road allowance may or may not exist along these roads. As the area has developed/redeveloped, lands for the right-of-way have been dedicated to the Municipality as part of Development/Subdivision Agreements. Speed limits on all arterial roads in the study area are 50km/h, except Rymal Road which is posted at 60km/h and the Linc posted at 90km/h.

Exhibit 3.4 illustrates the South Mountain Area transportation system. Below is a brief description of the arterial roads within the study area.

The following arterial roads have a 36m right-of-way:

- Rymal Road

  Predominantly a two-lane facility with a rural cross-section, the section from Upper James Street easterly to Springside Drive is four lanes with a Two-Way Left-turn Lane (TWLTL). Left-turn lanes are provided along the route and all major intersections are signalized except Upper Sherman Avenue.

- Garth Street

  A 4-lane divided roadway with an urban cross-section from Mohawk Road to Stone Church Road; two lanes to Rymal Road with a rural cross-section. Left-turn lanes provided at all major intersections. Right-of-way is 32m north of the Linc.

- Upper James Street

  A 4-lane roadway with an urban cross-section. A TWLTL is provided from Mohawk Road to the Linc and Stone Church Road to Rymal Road; there are no left turns provided between the Linc and Stone Church Road.

- Upper Wentworth Street

  A 4-lane roadway with an urban cross-section north of the Linc to Mohawk Road with auxiliary turning lanes for access to Limeridge Mall. A two-lane roadway with rural cross-section south of the Linc with left-turn lanes at signalized intersections.

- Upper Gage Avenue

  A 4-lane roadway with an urban cross-section from Mohawk Road to Stone Church Road with a TWLTL provided from Thorley Drive/Edwina Place south of Mohawk Road to Stone Church Road. A two-lane roadway with a rural cross-section south of Stone Church Road with left-turn lanes at Stone Church Road and Rymal Road.

- Dartnall Road

  A two-lane road with a rural cross-section from Stone Church Road to Rymal Road. The extension north from Stone Church Road are ramps to the Linc.

Similarly, the following arterial roads have a 30m right-of-way unless otherwise noted:

- Mohawk Road

  A four-lane facility with an urban cross-section. Left-turn lanes or a TWLTL are provided along the route and all major intersections are signalized.

- Stone Church Road

  A two-lane roadway with an urban cross-section and a TWLTL except for the section between Garth Street and Upper Wellington Street and east of Arbour Road which is rural with left-turn lanes at major intersections.

- Upper Paradise Road, West 5th Street, Upper Wellington Street, Upper Sherman Avenue

  All 4-lane roadways with an urban cross-section north of the Linc to Mohawk Road; two lanes with a rural cross-section to the south. Left-turn lanes are provided at major intersections. West 5th Street has a 26m right-of-way 90m south of Stone Church Road.

- Upper Ottawa Street

  A four-lane roadway with an urban cross-section from Mohawk Road to Rymal Road. A TWLTL is provided for the section south of Stone Church Road. Left-turn lanes are provided at major intersections for the section north of Stone Church Road.

- Nebo Road

  A two-lane road with a rural cross-section.

- Miles Road

  A two-lane road with a rural cross-section and a 26m right-of-way.

ii) Lincoln M. Alexander Expressway - 'The Linc' (refer to Exhibit 3.4)

The Linc bisects the South Mountain Area. Opened in October 1997, the Linc is a four-lane divided controlled access Regional freeway connecting to Highway 403 in the west and currently terminating at the Mud Street Extension in the east. When completed, the Red Hill Creek Expressway will connect to the Linc at an interchange between the Dartnall Road interchange and the Mud Street Extension. Between the terminal points, access to the Linc is by way of grade-separated interchanges at:

- Mohawk Road/Golf Links Road
- Garth Street
- Upper James Street
- Upper Wentworth Street
- Upper Gage Avenue
- Dartnall Road

iii) Connections (refer to Exhibit 3.4)

North - Connections to downtown are via well-established Escarpment crossings roads that range from 2-lane undivided to 6-lane divided facilities with controlled access. The following roads have direct access down the Escarpment:

- Garth Street via Beckett Drive (two-lane)
- West 5th Street via James Mountain Road (two-lane)
- Upper James Street via the Claremont Access (three lanes down, four lanes up)
- Upper Wellington Street via Jolley Cut/Arkledun (four-lane)
- Upper Sherman Avenue via the Sherman Cut / Access (two-lane;)
- Upper Ottawa Street via the Kenilworth Access (two-lane)

South - Regional connections to Glanbrook can be made as follows:

- Glancaster Road via Rymal Road
- Upper James Street
- Miles Road via Rymal Road
- Nebo Road via Rymal Road and Upper Ottawa Street/Kilbride Road

Town of Ancaster
City of Stoney Creek
Town of Glanbrook
A 1996 Population[2]
B Short Term Development - Estimated Population-
C Medium Term Development - Estimated Population-
NOTE
1 Existing Land Uses may not be accurate, as they are updated yearly
2 1996 Statistics Canada Census Population
SOURCE: FIELD CHECKED JANUARY 1998
PLANNING AND DEVELOPMENT DEPARTMENT
Computer Generated Map by Technical and Cartographic Section

SOUTH MOUNTAIN AREA TRANSPORTATION MASTER PLAN STUDY

Exhibit 3.3

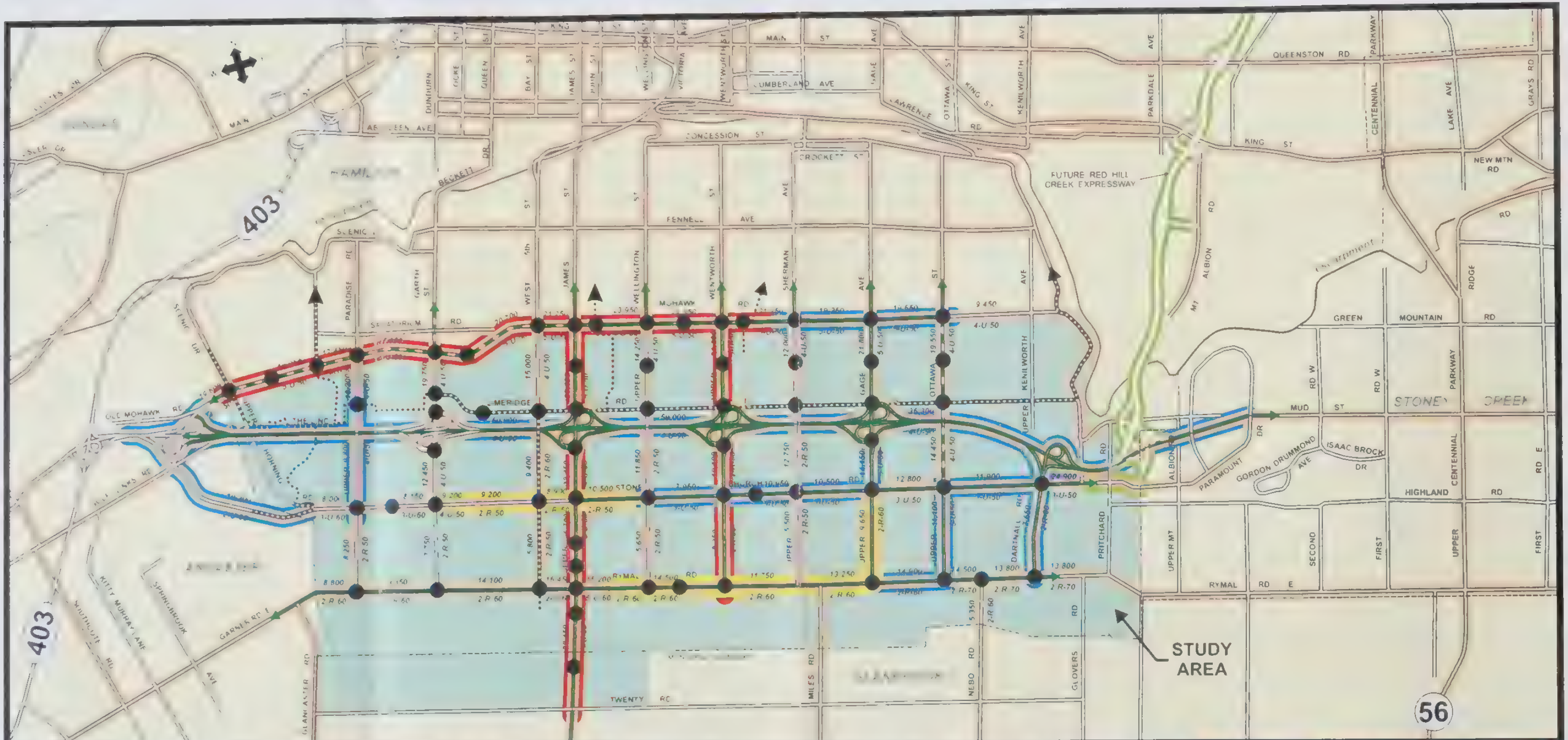
SHORT TERM DEVELOPMENT (1996-2000)
- Vacant Registered
- Approved Draft Plan of Subdivision

MEDIUM TERM DEVELOPMENT (2001-2003)
- Circulated Draft Plan of Subdivision

EXISTING LANDUSE[1]
- Single and Semi-Detached
- Attached Housing
- Apartment
- St. Elizabeth Retirement Village
- Commercial
- Restricted Commercial / Industrial
- Civic & Institutional
- Industrial
- Utilities
- Public School
- Separate School
- Park and Recreational / Open Space
- Vacant Land

PROPOSED LANDUSE
- Public School Lands
- Separate School Lands
- Park and Recreational / Open Space
- Retirement Village
- Lands of the UNC
- Neighbourhood Boundaries

EXISTING & PROPOSED DEVELOPMENT



SOUTH MOUNTAIN AREA TRANSPORTATION MASTER PLAN STUDY

Exhibit 3.4

Legend			
Red line	Major Transit Corridors	Solid line	Truck Route
Blue line	Recently (Re)constructed	Dashed line	Part-Time Truck Route
Green line	Scheduled for Construction	14,500	Daily Traffic Volumes (2-Way)
Yellow line	Environmental Assessment Complete	2-R-60	# of Lanes - Urban or Rural - Speed Limit (km/h)
Beige line	Regional Road	●	Signalized Intersection
Dotted line	Signed Bicycle Route		

EXISTING TRANSPORTATION SYSTEM 1998/1999

East - Regional connections to Stoney Creek can be made as follows:

- Mud Street Extension via the Linc
- Stone Church Road
- Rymal Road

West - Regional connections to Ancaster can be made as follows:

- Mohawk Road
- Linc
- Stone Church Road
- Rymal Road

iv) Transit (refer to Exhibit 3.4)

The primary study area is fully serviced by the HSR with 11 bus routes, most having direct connections to downtown. The service includes a major transfer terminal at Limeridge Mall and connections to Ancaster and Stoney Creek.

Glanbrook Trans-Cab, a unique shared-ride transit service operating as an extension of the HSR's Upper James Route, serves residents in northwest Glanbrook adjacent to the study area with taxicabs. Taxicabs connect to the Mountain Regional Transit Centre on Highway #6 for transfer to HSR buses. It is also a wheelchair accessible service.

The area is also served by the Region-wide Disabled Aged Regional Transit System (D.A.R.T.S.). It is a door to door transportation service employing wheelchair accessible buses and contracted taxi services when appropriate.

v) Truck Routes (refer to Exhibit 3.4)

The following roads in the study area are designated for use by heavy traffic:

- Mohawk Road - Garth Street to Upper Ottawa Street (restrictions from Garth Street to Upper James Street)
- The Linc
- Stone Church Road - Upper James Street easterly
- Rymal Road
- Upper James Street
- Upper Wentworth Street
- Upper Gage Avenue
- Upper Ottawa Street (restrictions from Mohawk Road to Stone Church Road)
- Dartnall Road

vi) Bicycle Network (refer to Exhibit 3.4)

In 1992, the Region's Bicycle Network Study outlined a proposed bikeway system. The Plan was predominantly geared to the needs of commuter cyclists and included actions that could be implemented relatively easily. The proposed network consisted mainly of bikeways on existing streets with some strategically located off-street bikeways. The Study included a five-year implementation program and a series of public awareness, educational and enforcement initiatives. Most proposals in the 1992 Study have now been implemented.

Since 1992, three important initiatives have demonstrated the community's commitment to support cycling as a key component of the Region's transportation system: the 1993 Vision 2020 Initiative, adoption of the updated Regional Official Plan in 1995 and completion of the Region's Transportation Review in 1996.

An update of the Network Study, "Shifting Gears: A New Cycling Plan for Hamilton-Wentworth", was completed in 1999. The results of a Community Cycling Survey and other data were used to develop the plan and prioritize an Action Plan to 2008. The focus of the Plan is the provision of safe cycling facilities through selective retrofitting of on-street routes, local improvements and further trail development.

Highlights from the analysis of cycling data include:

- Forty percent of the 18 and over population cycles when weather permits. Bicycles are used for both recreation and transportation (utilitarian) purposes.
- It is estimated that by 2006 the Region's residents will make 40,000 cycling trips daily when weather is favourable. This is a 60% increase over the 1997 level of 25,000. Much of this growth will be due to increased recreational cycling; demand for improved trails will therefore likely grow.
- Cycling activity is relatively low in the SMA compared to other areas in the City. The Linc and the disjointed local street network are considered barriers that discourage cyclists.
- Cyclists want improvements to both on-street and off-street bikeways forming an integrated network of on-street bike lanes and/or wider curb lanes and recreational trails.

A key component of the urban portion of the ultimate Bicycle Network is a spine route from Ancaster to Stoney Creek via the SMA. This route would follow Golf Links Road, Stone Church Road and Paramount Drive.

3.5.2 Existing Traffic (refer to Exhibit 3.4)

i) Traffic Patterns

Since the Linc opened traffic patterns have changed significantly (see Table 3.2). The freeway accommodates approximately 65,000 cars and trucks per day. As expected, traffic volumes on the east-west roads have reduced while traffic volumes on the north-south roads have increased, particularly those streets that have interchanges with the Linc.

Traffic patterns have now stabilized and are not expected to change significantly in the future even after the construction of the North-South Expressway.

Table 3.2 Changes in Traffic Volumes on Major Roads as a Result of Linc Opening

East-West Roads (Upper Paradise Road to Upper Ottawa Street)	
Rymal Road	35% Decrease
Stone Church Road	32% Decrease
Limeridge Road	76% Decrease
Mohawk Road	14% Decrease
North-South Roads (Rymal Road to Fennel Avenue)	
Upper Paradise Road	13% Increase
Garth Street	7% Increase
West 5th Street	10% Increase
Upper James Street	17% Increase
Upper Wellington Street	2% Increase
Upper Wentworth Street	33% Increase
Upper Sherman Avenue	3% Decrease
Upper Gage Avenue	27% Increase
Upper Ottawa Street	11% Decrease

ii) Traffic Volumes

Data on existing traffic was taken from 1997-1999 Intersection Counts and the 1998 Hamilton-Wentworth Traffic Volumes book provided by the City of Hamilton Department of Public Works and Traffic. Exhibit 3.4 shows all the transportation features of the road network including 24-hour traffic volumes, number of lanes, speed limits etc.

A cursory assessment of intersection performance was undertaken at 13 intersections within the study area using computer modelling software and available Intersection Count Data. These intersections were considered representative of major roadway intersection operations and possible capacity bottlenecks. The assessment indicated that all the intersections currently operate at a satisfactory Level of Service during peak periods (see Appendix 'A' for details).

iii) Road Condition

Most roads on the South Mountain are in need of some repair. Reconstruction of these roads has been delayed for several reasons:

expected changes in traffic patterns after the Linc opening;

the need to co-ordinate projects with the construction of sewers and watermains;

some of the cost of road improvements are shared with developers through a Development Charge levy;

the ability to obtain required right-of-way through dedication.

An assessment of road condition was carried out using information about road surface, base and structural integrity from the Region's Infrastructure Management Services database. The result of this assessment is information about the relative service life of each section of road (see Exhibit 3.5.)

iv) Road and Corridor Safety

The safety of road users (motorists, bus passengers, cyclists, and pedestrians) is a major consideration in determining the state of the network. In that regard, the City of Hamilton Public Works and Traffic Department compiles statistics on vehicle collisions using collision data obtained from the Regional Police Department, Ontario Provincial Police, and the Ontario Ministry of Transportation. Statistics are collected yearly and in some cases averaged over five years to get an understanding of trends. Exhibit 3.6 shows the road sections and intersections within the study area that have been identified with safety problems related to traffic.

3.5.3 Future Traffic Conditions

The current planned future transportation system will include two new major facilities, both with connections to the Provincial freeway network:

- The Red Hill Creek Expressway connecting the QEW and the Linc (as described above); and
- Highway 6 New connecting Hwy. 403 in Ancaster to existing Hwy. 6 south of the airport (the interchange at Hwy. 403 to Garner Road is partially built).

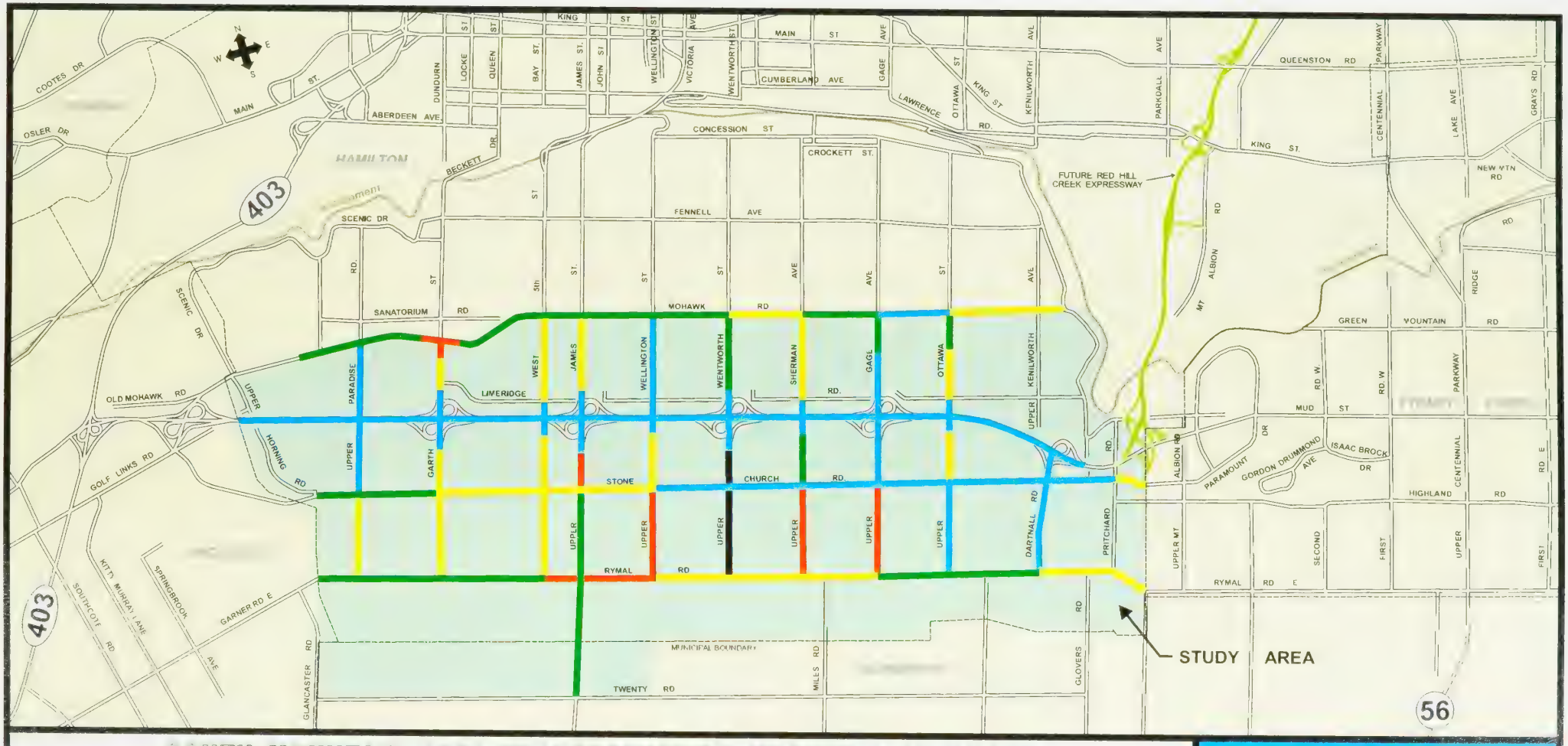
In addition, there are a number of other planned improvements to the Regional Road system outside the study area. The extent and assumed construction timing of these improvements are listed in Table 3.3.

i) Region of Hamilton-Wentworth Travel Demand Model

The Region of Hamilton-Wentworth Travel Demand Model was used to forecast future travel demand in the study area. Separate forecasts were made for 2001, 2006 and 2021. The model is computer-based and applies established mathematical relationships between land use, socio-economic characteristics, and transportation system factors to determine travel demand. In simple terms, the model assigns traffic to a road network using information such as the amount and location of population and employment, known travel patterns, number of trips generated by each land use, the proportion of trips that use transit, etc.

The steps carried out to develop travel demand forecasts can be summarized as follows:

1. Population and employment analysis determines the magnitude of activity and planned growth in an area.
2. Land use analysis determines where the activities will be located.
3. Trip generation determines how many trips each activity will produce or attract.
4. Trip distribution determines the origin and the destination of trips that are generated at a given activity.
5. Modal split determines which mode of transportation will be used to make the trip.
6. Traffic assignment determines which route is used when making the trip.



SOUTH MOUNTAIN AREA TRANSPORTATION MASTER PLAN STUDY

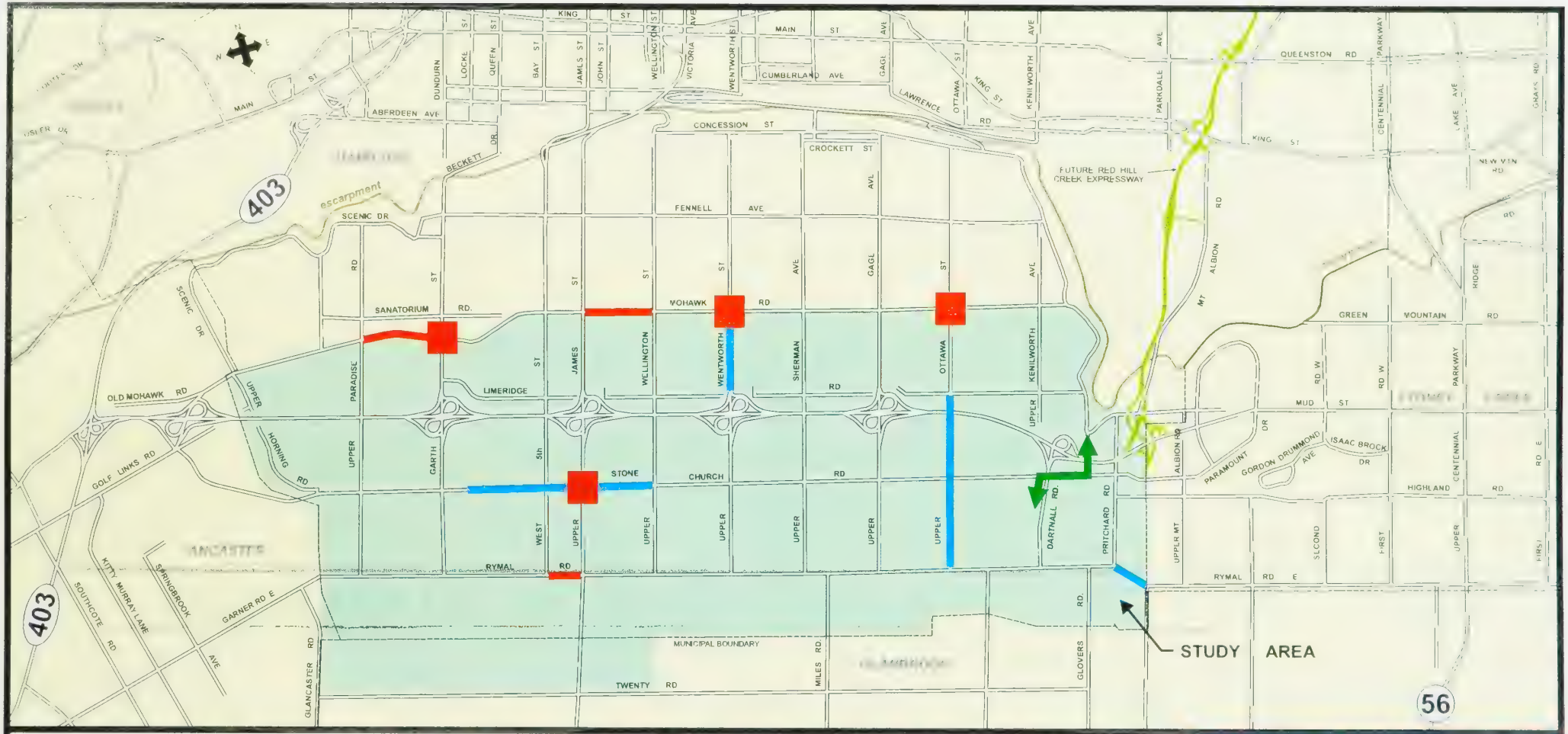
Exhibit 3.5

ROAD CONDITIONS

1999

Road Condition *	Relative Remaining Life
Very Good	12 to 15 years with some maintenance
Good	10 to 12 years with some maintenance
Fair - Good	8 to 10 years with some maintenance
Fair	6 to 8 years with some maintenance
Poor - Fair	1 to 6 years with some maintenance

* *includes condition of road surface, road base and overall structural integrity*



SOUTH MOUNTAIN AREA TRANSPORTATION MASTER PLAN STUDY

Exhibit 3.6

Roads with Significantly Higher Accident Rate Than Would Be Expected

On-Street Bike Route with Moderate to High Volumes and/or Narrow Traffic Lanes

Intersections with the Highest Number of Collisions

Future Connection of Caledonia Rail Trail to Escarpment Rail Trail

ROAD & CORRIDOR SAFETY

Table 3.3 Network Assumptions for Travel Demand Modelling

Planned improvements by 2001	
1	Highway 5 (Flamborough) - Hwy.6 to Hamilton St. (2 lanes each direction)
2	Highway 6 (Flamborough) - Hwy.5 to Regional boundary (5 lane cross section)
3	Highway 6 (Dundas) - Hwy.5 to QEW (3 lanes NB; 2 lanes SB; interchange at York Rd Plains Rd. rerouted to York Rd.; other access closed)
4	Stone Church Road - Anchor Rd. to East of Pritchard Rd. (3 lane cross section)
5	Mud Street Extension - Paramount Dr. to the Linc (1 lane each direction from Dartnall to Winterberry; 2 lanes each direction easterly)
Planned improvements by 2006	
1.	Highway 407 (Burlington/Oakville) - Hwy.403 to Freeman IC (2 lanes each direction)
2.	North-South Expressway – Stone Church Rd. to QEW (2 lanes each direction)
3	Stone Church Road - East of Pritchard Rd. to Trinity Church (3 lane cross section)
4.	Mountain Brow Boulevard - delete link at N-S Expressway
Planned improvements by 2021	
1	Trinity Church Extension north to Stone Church from Twenty Road
2	Highway 6 New (Ancaster/Glanbrook) - Hwy.53 to Hwy.6 (2 lanes each direction)
3	Highway 5 (Flamborough) - Waterdown Bypass (2 lanes each direction)
4	Wilson Street (Ancaster) - Mohawk Rd. to Hwy.403 (3 lane cross section))
5.	Dartnall Road Extension (Hamilton/Glanbrook) - Rymal Rd. to Dickenson Rd. (2 lanes each direction)
6.	Highway 8 (Stoney Creek) - Millen Rd. to Jones Rd. (5 lane cross section)
7.	Fruitland Road (Stoney Creek) - Barton St. to Hwy.8 (2 lanes each direction)
8.	Highway 403 (Hamilton/Ancaster) - Hwy.6 to RHCE (add one lane each direction)
9.	Parkside Drive (Flamborough) - Hwy.6 to Evans Rd. (2 lanes each direction)
10.	Hamilton Street (Flamborough) - Hwy.5 to Waterdown Rd. (5 lane cross section)
11.	Waterdown Road (Flamborough) - Hwy.403 to Mountain Brow Rd. (Waterdown) (2 lanes each direction)
12.	Mountain Brow Road Extension (Flamborough) - Mountain Brow Rd. to Hwy.5 (1 lane each direction)
13.	Industrial Perimeter Road - Burlington St. to Hwy.403 (2 lanes each direction)

ii) Network Assumptions

Each traffic assignment was based on a road network that included all existing major roads plus the planned improvements outside the study area (see Table 3.3). The planned improvements inside the study area were excluded because the justification for these improvements are subject to this study.

iii) Land Use

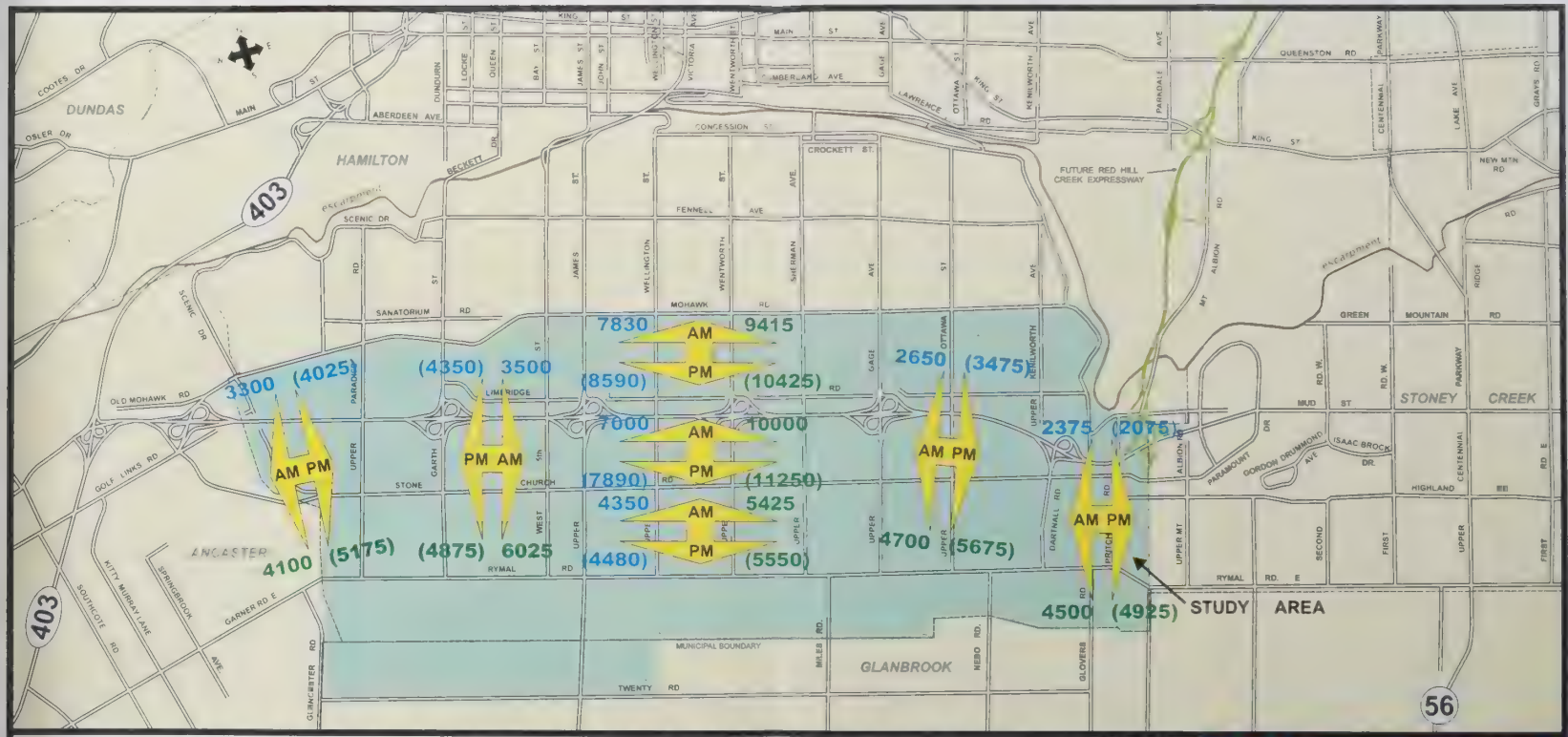
As noted in Section 3.4, the number of people living and working in the Hamilton Mountain area is expected to grow by about 21,850 and 10,700 respectively over the next 20 years. The majority of this growth is planned for the South Mountain Area. As this occurs, adjacent communities such as Heritage Green in Stoney Creek and the Meadowlands in Ancaster will also grow in population and employment.

iv) Future Traffic Volumes

Traffic assignments were 'run' for existing conditions (1998 Base Network) and forecast for 2001, 2006, and 2021 to determine future traffic volumes. It is assumed that the North-South section of the Red Hill Creek Expressway will be constructed by 2006 provided construction proceeds in 2001. As a sensitive analysis gauging the influence of the North-South sections, assignments were run for 2006 and 2021 without the Expressway in the network.

The model produces a.m. peak hour results that were then converted to p.m. conditions for analysis purposes to represent the busiest conditions. Compared to the trips in the a.m., afternoon trips are usually higher due to the addition of shopping trips and leisure trips.

Exhibit 3.7 illustrates future traffic flows for the peak hour peak direction for the 2021 horizon year assuming no expansion of the road network in the study area



SOUTH MOUNTAIN AREA TRANSPORTATION MASTER PLAN STUDY

Exhibit 3.7

AM

Peak Direction of Traffic and Time Period

VEHICLES PER HOUR	AM PEAK HOUR	PM PEAK HOUR
1998	2375	(2075)
2021	4500	(4925)

2021 PEAK HOUR TRAFFIC FLOWS (1-WAY)

4.0 Problems and Opportunities

In recent years, increases in population and employment in the South Mountain Area have outpaced the upgrading of roads needed to accommodate the subsequent growth in traffic. Many roads along urban developments, in particular, north-south roads have gravel shoulders and grassed ditches.

The major recent improvement to the road network was the opening of the Linc in October 1997. In terms of travel demand, the effect of the Linc has diverted significant traffic from east-west roads which had become increasingly congested over the last few years. As a result, volumes on all major east-west roads have decreased and most north-south have increased, changing traffic patterns significantly (see Table 3.2).

These changes, the need to improve SMA roads, as well as planned future growth, make it appropriate to determine future requirements for the transportation system. Typically, these requirements are investigated on a road-by-road basis. In this study, however, the need for improvements to all roads in the network is being reviewed at the same time.

In taking this network approach to transportation planning, the needs for the transportation system can be determined by:

- identifying existing and future anticipated problems affecting the operation and efficiency of the transportation system;
- identifying opportunities to make improvements to the transportation system; and
- proposing solutions to the noted problems and opportunities.

4.1 Problems

Potential transportation problems to be addressed in this Study fall into the three general categories of:

- *Road Capacity and Level of Service (LOS)*

  Capacity is defined as the maximum number of vehicles that can pass over a given section of roadway, in one direction, or both directions, during a specified time period (typically one hour) under prevailing roadway and traffic conditions. A problem exists when traffic volumes begin to approach the capacity of a road over a specified time period. Level of Service is used as a qualitative measure of how well the road can accommodate traffic demand.

- *Road and Corridor Safety*

  For this study, Road and Corridor Safety involves the investigation into vehicle accident histories along specific roads to determine the relative safety performance of a given road compared to acceptable standards. It also includes a review of a road's level of safety in terms of both pedestrians and cyclists. A safety problem is said to exist when a given location experiences collisions at a rate that is higher than would normally be expected at that location.

- *Road Condition*

  For this study, road condition is expressed in terms of an overall condition description (good, fair, poor) and the relative remaining service life in years. It is based on a technical assessment and computerized analysis tool used by the Region to programme when and what type of improvements are needed on individual road sections.

4.2 Opportunities

Opportunities to make improvements to the transportation system are identified as a result of the investigation into Problems. They were considered if changes could be made that would not affect user safety or create unacceptable traffic congestion. Opportunities typically fall into two categories:

- those that arise in a corridor as a result of the need to make other improvements; and
- those that become apparent in a corridor as a result of the need to make improvements in another corridor.

Adding turning lanes and bike lanes, are two examples of opportunities.

4.3 Needs Assessment (Identification of Problems and Opportunities)

A needs assessment was undertaken for the three problem categories as described in the preceding section in order to identify the existing and future anticipated problems affecting the operation and efficiency of the transportation system. The results of the assessment were also used to identify opportunities as described above.

4.3.1 Road Capacity and Level of Service

i) Screenline Analysis

A detailed traffic analysis was undertaken for existing and future conditions. The analysis consisted of a review of intersection Level of Service for major intersections in the South Mountain Area and a Screenline Analysis to determine the relationship of general traffic flows to available capacity across broad corridors. A Screenline is made up of a series of traffic count stations strategically located across major parallel roads or along a natural physical feature such as the Escarpment.

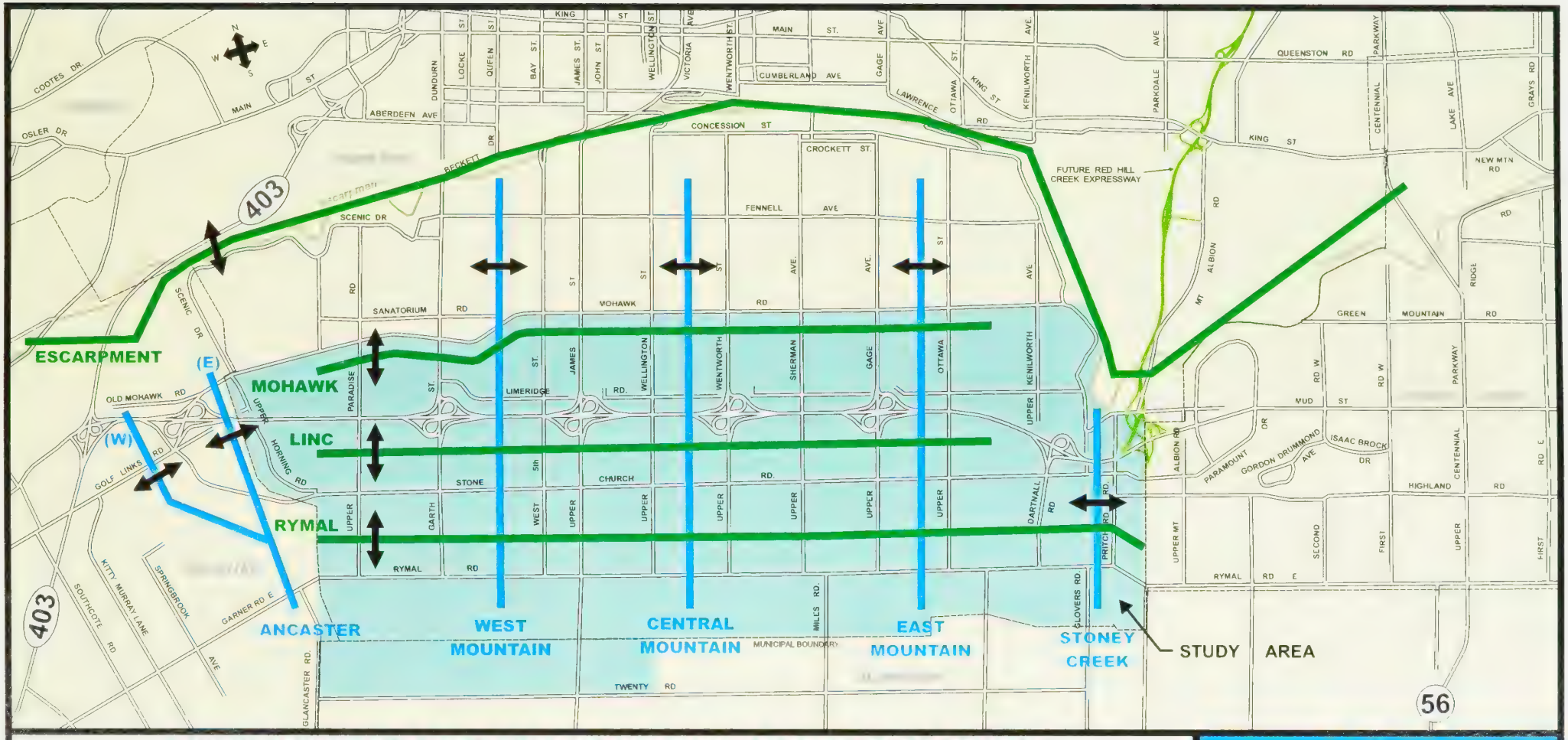
For **north-south traffic**, Screenlines were located:

- North of and parallel to Rymal Road
- South of and parallel to the Linc
- South of and parallel to Mohawk Road
- Along the Escarpment

For **east-west traffic**, Screenlines were located:

- Along the west city limit
- West of and parallel to West 5th Street
- Between Upper Wellington Street and Upper Wentworth Street
- East of Upper Gage Avenue
- Along the east city limit

Exhibit 4.1 shows the Screenlines used for the analysis



SOUTH MOUNTAIN AREA TRANSPORTATION MASTER PLAN STUDY

Exhibit 4.1

Flow of Traffic

North-South Screenline

East-West Screenline

SCREENLINES

ii) Road Capacity and Level of Service

For planning purposes, the basic assumption for South Mountain Regional roads is that the carrying capacity (c) of one lane of road in one direction is approximately 800 vehicles per hour.

Generally, this accounts for the area's prevailing roadway conditions (lane geometry etc.), traffic conditions (vehicle type, directional split etc.), and control conditions (traffic signals, traffic regulations etc.). The road is said to be operating at capacity once traffic volumes approach this limit in any given hour.

Level of Service (LOS) is used to qualitatively measure the operating conditions of the road. For a planning level of analysis, six levels of service have been defined with the letters A through F, providing from best to worst in terms of driver satisfaction. Level of Service can be determined when traffic volume (v) is compared to road capacity (c) as a ratio. For example, Level of Service 'F' corresponds with a v/c >1.0.

Level of Service (LOS) and the corresponding v/c ratios used for this study are described in Table 4.1.

Table 4.1 Level of Service Description

LOS	v/c Ratio	Description
A	0-0.60	Highest quality of traffic flow. Traffic density is low and drivers are free to drive at their desired speed with little or no delay.
B	0.60-0.70	Stable traffic flow with operating speeds beginning to be restricted by traffic conditions. Reductions in speeds are not unreasonable.
C	0.70-0.80	Stable flow but speeds and maneuverability are more closely controlled by higher volumes. Most drivers are restricted in their ability to select their own speed.
D	0.80-0.90	Approaching unstable flow. Tolerable speeds maintained but considerably affected by changes in traffic conditions. Fluctuations in volume can cause substantial drops in speeds. Drivers have little freedom to maneuver.
E	0.90-1.0	Flow is unstable with possible stoppages. Volumes are approaching capacity and operating speeds are low.
F	>1.0	Forced flow operation. Volume and speeds can drop to zero resulting from restrictions downstream. Speeds are substantially reduced and stoppages may occur for short or long periods.

iii) Areas of Congestion and Possible Areas of Congestion

The Screenline Analysis provides information about the ability of the road network to accommodate travel demand in terms of v/c ratios and Level of Service. From this, corridors that are/will be congested can be identified. For this study congested areas are defined as a set of two or more roads that have a LOS 'E' or worse.

Areas of possible congestion have also been identified because at a planning level, travel demand modelling is only considered accurate to within +/-20%. Further to this, it is important to recognize that the precision of modelling results is best when considering travel flows across groups of roads and not individual roads. Due to the nature of the model structure, modelled traffic flows on individual roads may be very high and the next parallel road very low. In real life, it would be expected that traffic would naturally divert to the less congested route. However, to be conservative, in such situations the screenline has been flagged as a possible area of congestion.

4.3.2 Results of Screenline Analysis

4.3.2.1 Existing Conditions (see Exhibit 4.2)

The Screenline Analysis shows that, based on 1998 conditions, there is an existing traffic congestion problem crossing the Linc Screenline. The problem is focused at a subscreenline level (i.e. not across the whole Screenline) on Upper James, Upper Wellington, and Upper Wentworth streets. Both Upper Wellington Street and Upper Wentworth Street are congested the a.m. peak hour northbound direction, and Upper James Street in the p.m. peak southbound direction. The Subscreenline LOS at this location is 'C' in the a.m. peak northbound direction and 'E' in the p.m. peak southbound direction.

The problem appears to be the result of some local commuter trips using the closest and most convenient route to go northbound in the a.m. (Upper Wellington Street, and Upper Wentworth Street) and shifting to Upper James Street in the p.m. to do their shopping before heading home.

In terms of 1998 conditions, capacity problems were noted at the Stoney Creek Screenline. However, with the opening of the Mud Street Extension in 1999, the problem has been resolved.

4.3.2.2 2001 Forecast (see Exhibit 4.2)

The Linc Subscreenline congestion problem is exacerbated somewhat by continued growth in the area. The LOS at the Subscreenline is 'D' in the a.m. peak northbound direction and 'F' in the p.m. peak southbound direction. All other Screenlines operate with a good Level of Service (LOS 'C' or better).

4.3.2.3 2006 Forecast (see Exhibit 4.3)

Given the relatively short 5-year growth period from 2001, the Linc Screenline doesn't degrade significantly. The Red Hill Creek Expressway, once completed, will be able to divert some of the Central Mountain north-south demand north of the Linc. The Linc LOS at the Subscreenline is 'D/E' in the a.m. peak northbound direction and 'F' in the p.m. peak southbound direction. All other Screenlines operate with a good Level of Service (LOS 'C' or better).

Two Subscreenlines were noted to be possible areas of congestion:

- East-west traffic on Rymal Road and Stone Church Road at the Ancaster Screenline; and
- North-South traffic on Upper Sherman, Upper Gage and Upper Ottawa at the Mohawk Screenline.

SOUTH MOUNTAIN AREA TRANSPORTATION MASTER PLAN STUDY

Exhibit 4.2

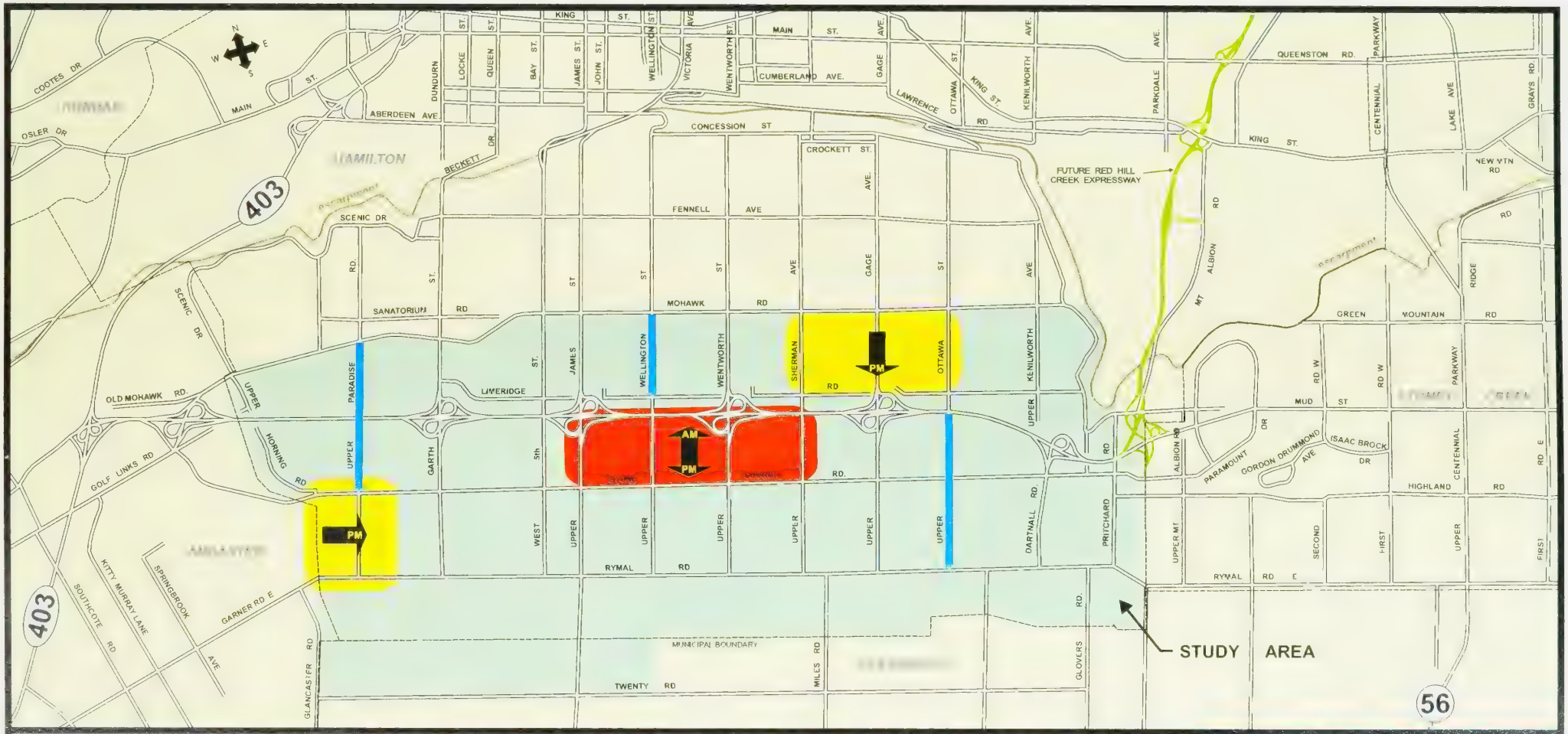
PM

Direction of Traffic and Time Period

Area of Congestion

Under-utilized Corridors

AREAS OF TRAFFIC CONGESTION 1998 - 2001



SOUTH MOUNTAIN AREA TRANSPORTATION MASTER PLAN STUDY

Exhibit 4.3

Under-utilized Corridors

Possible Area of Congestion
(diversion of traffic to other less busy major routes may occur)

Direction of Traffic and Time Period

Area of Congestion

AREAS OF TRAFFIC CONGESTION

YEAR 2006

4.3.2.4 2021 Forecast (see Exhibit 4.4)

Growth to the planning horizon shows congestion worsening in the already noted areas and becomes evident in three new areas.

i) Noted Problem Areas

- **Linc Subscreenline** - Congestion along this subscreenline expands to include West 5th Street and Upper Sherman Avenue and is LOS 'F' in both peak periods.
- **Ancaster Subscreenline** - This subscreenline will become more critical in 2021 with a LOS 'E/F' in the p.m. peak period eastbound direction. Stone Church Road will likely be the critical road with possible diversion to both the Linc and Rymal Road.
- **Mohawk Subscreenline** - This subscreenline will remain a possible area of congestion because of the importance of Upper Gage Avenue as an east end north-south road with a connection to the Linc. Upper Gage Avenue will be the choke point in this area if traffic doesn't divert to Upper Ottawa Street and Upper Sherman Avenue.

ii) New Problem Areas

- **Stoney Creek Screenline** - This is an area of possible congestion as eastbound volumes will be approaching this screenline's practical capacity in the p.m. peak hour operating at a LOS 'E'. The Linc shows as the critical section, however, local trips may divert from the facility to Stone Church Road and Rymal Road.
- **West Mountain Screenline** - This screenline becomes an area of possible congestion in the westbound p.m. peak hour with a LOS 'D/E'.
- **The Linc** - By 2021 traffic demand along the Linc begins to approach the practical capacity of the roadway. The ability of the freeway to accommodate the additional traffic is a function of driver acceptance of inevitable congestion as flows gradually increase. Based on the capacity assumptions for the Linc (1800 vehicles per lane/ per hour), the a.m. and p.m. peak hour will operate under LOS 'D/E' and LOS 'E/F', respectively.

4.3.2.5 Opportunities based on Capacity Analysis

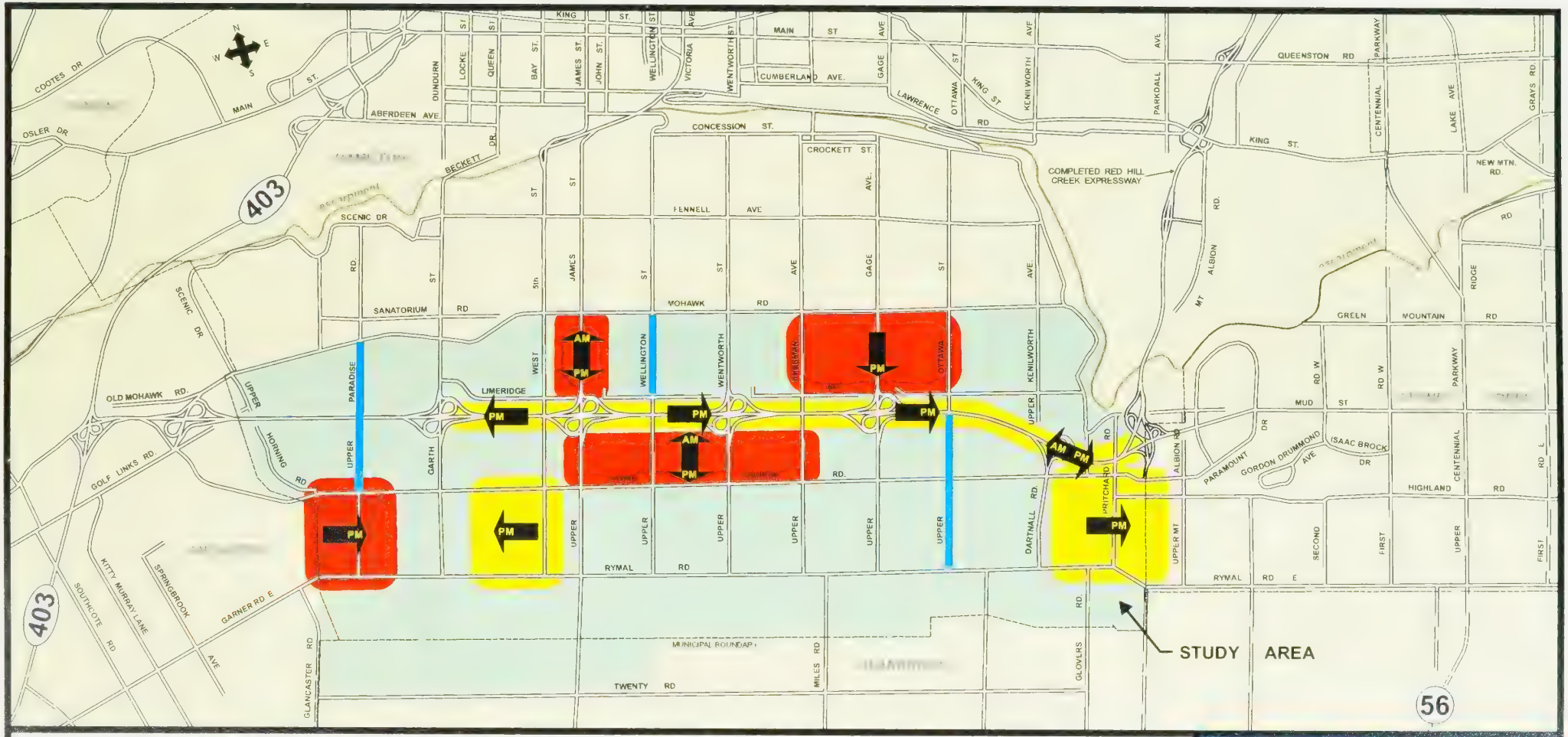
Existing conditions and forecasts to 2021 show that, based on available capacity across the Screenline, there is a general under-utilization of the following roads:

- Upper Paradise Road - Stone Church Road to Mohawk Road
- Upper Wellington Street - Limeridge Road to Mohawk Road
- Upper Ottawa Street - Rymal Road to Limeridge Road

These roads represent corridors where opportunities to enhance the transportation environment of other modes may be possible.

4.3.2.6 Summary

The Screenline Analysis indicates short term and long term Areas of Congestion focused along parts of the Linc Screenline. Possible Areas of Congestion will occur along the Mohawk, Ancaster, West Mountain, and Stoney Creek screenlines.



SOUTH MOUNTAIN AREA TRANSPORTATION MASTER PLAN STUDY

Exhibit 4.4

AREAS OF TRAFFIC CONGESTION YEAR 2021

Under-utilized Corridors

Direction of Traffic and Time Period

Area of Congestion

Possible Area of Congestion (*diversion of traffic to other less busy major routes may occur*)

In order to ensure acceptable Levels of Service for vehicle traffic in these areas over the long term, lane capacity is required as follows:

- Linc Screenline - two additional lanes in both the northbound and southbound direction from West 5th Street to Upper Sherman Avenue. One lane in each direction is needed in the short term; the remainder in the long term.
- Ancaster and West Mountain Screenline - one additional lane in both the eastbound and westbound direction from Stone Church road to Rymal Road in the long term.

In addition to the congested areas, there are sections along three roads where they may be an opportunity to enhance the transportation system for other users because of low traffic volumes.

4.3.3 Road and Corridor Safety

Collision data compiled by the Traffic Department includes vehicle-vehicle collisions (autos/trucks), vehicle-pedestrian and vehicle-bicycle collisions. On the basis of total collision per 1,000 population, rates in Hamilton-Wentworth are very close to the lowest in the country. In terms of injuries per 1,000 population the City and Region are better than average. Its interesting to note that over half of all reported vehicle-bicycle collisions result from bikes being ridden on the crosswalk and/or sidewalk.

A review of collision histories across the SMA indicated a number of road sections and intersections that have collision rates that are higher than would normally be expected (see Exhibit 3.6). Other areas have been noted that do not have a collision problem but have been identified by the public as areas where safety is a concern.

i) Road Sections

- Mohawk Road - Upper Paradise Road to Garth Street

  This section of road is on a curve and has poor intersection spacing that leads to poor signal progression. Rear-end collisions prevail.
- Mohawk Road - Upper James Street to Upper Wellington Street

  A mid-block entrance to the Canadian Tire Store is problematic.
- Upper Paradise Road - Vicinity of St. Thomas More School south of Stone Church Road

  Although no recorded collision history exists at this location, there is a potential safety problem associated with school peak traffic and poor internal road design access at the school.
- Rymal Road - West 5th Street to Upper James Street

  This short section of road with access to South Hamilton Square on the north side and other businesses on the south side experiences a high number of collisions caused by the general design layout of the road and driveway accesses.

ii) Intersections

- Upper James Street at Chipman Avenue/Blossom Lane – Mid-block intersection between the Linc and Stone Church Road

  Residential development is occurring rapidly east of Upper James along Chipman Avenue. There is not a recorded collision problem at this location but residents of the area have filed a petition with the Region concerning the lack of turning lanes on Upper James and need for a traffic signal at this intersection.

- Upper James Street at Stone Church Road

  There is a collision problem at this intersection caused by heavy volumes and substandard design of the approaches.
- Mohawk Road at Upper Wentworth Street

  Problem is likely related to high traffic volumes. Further investigation required.
- Mohawk Road at Upper Ottawa Street

  Intersection was improved recently to include left-turn lanes. Further investigation required.

iii) Pedestrians

Although pedestrian safety is always a concern along roadways and at intersections there are no specific areas in the study area where pedestrian safety is significantly different than other parts of the city. In addition, because of the layout of subdivisions and low urban density, walking does not play a major role as part of the transportation system in the SMA.

However, in an effort to improve existing pedestrian facilities, the RTR (1996) listed a number of objectives and recommended actions that could be implemented to enhance the attractiveness of walking, several of them related to increasing the safety of the pedestrian environment. In that regard, improvements to the SMA transportation network can be viewed as an opportunity to increasing the safety of the pedestrian environment.

iv) Cyclists

The Regional Official Plan acknowledges that cycling is an essential form of transportation for many residents. On that premise, the Region developed a substantial bicycle network system consisting mainly of bikeways on existing streets with some strategically located off-street bikeways.

The existing bicycle network on the Mountain is rudimentary with many hazardous locations because of disjointed connections between adjoining subdivisions.

The focus of the recently published "Shifting Gears - A New Cycling Plan for Hamilton-Wentworth" is to provide safe cycling facilities through selective retrofitting of on-street routes, local improvements and further trail development. In that regard, improvements to the SMA transportation network can be viewed as an opportunity to enhance the bicycle network.

4.3.4 Road Condition

As noted in Section 3.5.2, most roads in the SMA are in need of some repair. Roads considered in Poor-Fair and Fair condition have the highest need for improvement in the short term (1-8 years). In order of priority they include the following:

1. Upper Wentworth Street - Rymal Road to Linc
2. Upper James Street - Linc to Stone Church Road
3. Upper Sherman Avenue - Rymal Road to Linc
4. Upper Gage Avenue - Rymal Road to Linc
5. Rymal Road - West 5th Street to Springside Drive
6. Upper Wellington Street - Rymal Road to Linc

All SMA roads and the time in which they need repair can be found in Appendix 'F'.

5.0 Analysis and Evaluation of Alternatives

The traffic, safety and road condition analysis documented in Chapter 4 outlines the extent of **problems and opportunities** with the SMA transportation system. To solve the problems and make use of the opportunities, the EA process requires that all reasonable and feasible solutions be identified and described. These solutions are referred to as the **alternative solutions** and were evaluated to determine the most appropriate course of action. The result of this evaluation is the **preferred solution** (see Section 5.1& 5.2).

Following the selection of the preferred solution, an assessment was carried out on different **network options** to determine the best way of implementing the preferred solution (see Section 5.3). This was a two-stage process that began with the identification of **guiding principles for roadway planning** (see Section 5.3.1). These were used to ensure that only reasonable and feasible network options were assessed and their application results in a set of improvements being identified (see Section 5.4).

Where the guiding principles were not applicable, network options were evaluated for their transportation benefits and effects on the natural, social, economic, and cultural environments using **evaluation criteria** (see Section 5.5).

The investigation into network options resulted in proposed improvements that would solve the noted problems, but also led to the identification and subsequent evaluation of **transportation opportunities** (see Section 5.6).

The culmination of the evaluation process was the identification of the **technically preferred network option** (see Section 5.7) and includes the development of an **implementation plan** (see Section 5.8). Both were presented to the public as part of the consultation program (see Section 5.9)

5.1 Alternative Solutions

There is usually more than one way to solve a problem and therefore alternative solutions must be evaluated. This will lead to **the preferred solution**. Alternatives that were considered within the scope of this Study are listed below in terms of the three general categories of problems identified in Section 4.1:

i) Road Capacity

- Expand existing transit service (more bus routes, dedicated bus lanes, etc.)
- Limit or manage growth
- Divert traffic to other roads
- Widen existing roads
- Construct new roads

ii) Road Safety

- Modify grade and/or alignment
- Resurface existing roads
- Reconstruct existing roads
- Modify traffic patterns with added turn lanes

iii) Road Condition

- Resurface existing roads
- Reconstruct existing roads

In addition to the alternative solutions listed above the "Do Nothing" alternative will also be considered. In the "Do Nothing" alternative no improvements would be made to address the identified problem/deficiency or opportunity. A decision to "Do Nothing" would typically be made when the impacts of an alternative outweigh the benefits.

5.2 Selecting the Preferred Solution

The following set of alternatives was evaluated for their ability to address: transportation needs, travel patterns, safety issues, transit potential, and changes in land-use:

- Expanding Transit
- Limiting or Managing Growth
- Diverting Traffic to Other Roads
- Building New Roads
- Widen Existing Roads
- Do Nothing

The result of the assessment was the identification of the preferred solution and is described below.

5.2.1 Transit

As part of the Regional Transportation Review (RTR) Study, a Transit Plan was developed in accordance with an objective contained in Vision 2020 that aims to increase the share of trips taken within the Region from 50 rides per capita per annum to 100 rides per capita per annum. The Plan states that the objective is ambitious but achievable over the long term. The Plan recommended a series of initiatives to attain the goal over the 20 year time period.

With regard to the South Mountain, a corridor across the escarpment from Limeridge Mall to the Downtown Area was identified as the major north south transit corridor in the Region because it is able to support higher density transit service.

In addition, three transit technologies were evaluated:

- Light Rail Transit (LRT)
- Busway
- Express Bus on Existing Roadways (Bus Rapid Transit)

It was determined that of the three transit technologies, only Bus Rapid Transit was feasible. Given the cost, both LRT and Busway technologies are only effective with high travel demand (5,000 to 15,000 passengers per hour) and no corridors in Hamilton exhibit that demand. Bus Rapid Transit was identified as the most preferred approach because:

- it can provide a good service level;
- it does not require a major capital investment; and
- it does not preclude consideration of higher capacity technology in the future.

Within the study area, the Transit Mode Split (TMS) is approximately 5% and up to approximately 10% in major corridors (Upper James Street, Upper Wentworth Street, and Mohawk Road). As noted, a goal of Vision 2020 is to double the rides per capita per annum by Year 2020. This equates to about a doubling of the TMS by the planning horizon (about 20% in the major corridors).

Based on existing travel demand and the identified short-term capacity deficiency in the Upper James Street/Upper Wentworth Street Corridor, a TMS of 20% is required in the short to medium term to eliminate the need for additional lanes. Extrapolated to Year 2021, a TMS of 35-40% is required to eliminate the need for any road widening.

While a 20% TMS may be achievable over the long term, it is unreasonable to expect it to occur in the short-term as transit use in terms of trips per person per year is actually declining. The Canadian Urban Transit Association reports that a number of national socio-demographic trends will impact on future transit use. These include:

- aging of the baby-boom generation;
- varying transportation needs of females in the work force (parent versus non-parent); and
- urban sprawl.

Another important trend affecting transit use on the Mountain is that there is free parking in almost all areas south of the escarpment and an oversupply of inexpensive long-term parking downtown.

Hence, the plans to expand transit to meet objectives of Vision 2020 are not considered to be an acceptable stand-alone solution that would address expected growth in population and traffic in the area over the long term. Nevertheless, the planned expansion of transit would enhance any solution that is selected.

5.2.2 Limit or Manage Growth

The land use plan for the South Mountain is well established with minimal amounts of undeveloped land remaining and existing Plans of Subdivision in place for most undeveloped areas. Neighbourhood Plans describe how the remaining areas will develop. These plans, developed by the City of Hamilton Community Planning and Development Department, have Council endorsement as per the Regional Official Plan (OP).

With the limited amount of developable land available, a change in land use that would generate less traffic would not reduce the overall travel demand; additional lanes for motor vehicles would still be needed.

Therefore, limiting growth on the South Mountain as a way to address the need to provide additional road capacity was not considered to be an acceptable solution and as such has been set aside as an alternative.

5.2.3 Divert Traffic to Other Roads

Generally, the total travel demand across the South Mountain is lower than the total available capacity of all roads. However, certain roads exhibit greater levels of congestion than others do because of:

1. The out-of-the-way travel necessary to divert to other major roads.
2. Route selection on the Mountain tends to be dictated by the accessibility to adjacent land uses (e.g. Lime Ridge Mall, Ancaster Power Center), the Linc, the Escarpment and connections to other Regional centres (Ancaster, Stoney Creek).

Roads with connections to the Linc, the Escarpment and those that have significant adjacent commercial development experience the highest travel demand (e.g. Upper James Street). Roads without significant connections and more residential development tend to experience lower traffic volumes that are more local in nature (e.g. Upper Paradise Road).

As roads become more congested, drivers tend to divert to roads less congested in order to reduce travel times and frustration. However, diversion is expected to be minimal because of the out-of-the-way travel necessary to divert and the modelling results that indicate none of the major routes will be significantly underutilized in the future (i.e. no other roads would be attractive for diversion because they will all be equally busy).

In addition, diversion normally occurs only when the diversion route is not so far out of the way that travel times actually increase. The road network on the South Mountain is such that through trips would tend to divert on the Regional Road grid but some local trip infiltration through neighbourhoods would be expected even though most internal roads are not continuous between major roadways.

Trip diversion is also more likely to occur with trips destined to and from the South Mountain. Through trips are less likely to divert because of driver unfamiliarity with the road network and the limited choices in routes.

Since forcing traffic to divert would likely not be successful, certain congested roads will become more congested for longer time periods resulting in an unacceptable Level of Service and safety concerns.

Therefore, traffic diversion is not a reasonable approach to addressing the need to provide additional road capacity and was set aside.

5.2.4 Build New Roads

The existing Regional Road network is complete across the Mountain consisting of north-south and east-west roads in a grid pattern. They generally follow existing lot lines and concessions as surveyed in the 19th Century and form the boundary roads for 43 Planning Neighbourhoods as defined by the Official Plan.

Existing and future travel demand across the South Mountain indicates that the existing road network is adequate with respect to location and structure. That is, additional lanes for auto users, transit and cyclists can be accommodated within the existing rights-of-way and no new arterial roads are required. In addition, the majority of neighbourhoods have been fully developed and only infilling remains, mostly south of the Linc, thereby physically limiting the opportunities to develop new rights-of-way.

Therefore, Build New Roads was rejected as an alternative.

5.2.5 Expand and Upgrade Existing Roads

Results of the existing and future travel demand analysis indicate that a relatively small amount of road widening would accommodate future growth to 2021. Therefore, Expand and Upgrade Existing Roads was identified as the best approach to address short and long term transportation network requirements for auto and transit users, cyclists and pedestrians. With adequate existing rights-of-way, road expansion can be designed to incorporate enhancements for all users. For example, road expansion can provide opportunities to upgrade facilities for bikes with the inclusion of wider lanes.

Well maintained, good quality roadways allow for the safer and more efficient movement of people and goods and have lower maintenance costs and longer service life. In order that the South Mountain can develop as per the OP and for the existing transportation network to continue providing a satisfactory Level of Service for all users, including transit, cyclists and pedestrians, the timely expansion and upgrading of Regional Roads is necessary

5.2.6 Do Nothing

While a certain level of congestion maybe expected, it is preferred to maintain existing Level of Service across the network. The "Do Nothing" was not preferred over the "Expand and Upgrade Existing Roads" solution because:

- Existing travel demand across the South Mountain indicates that certain roads are approaching their practical carrying capacity (refer to Section 3.4); planned growth is expected to exacerbate the problem and lead to significant levels of congestion in the peak periods.
- Increased traffic congestion has significant socio-economic implications. It is a barrier to economic growth and thus would not support land use objectives for the area.
- It leads to greater driver frustration that puts the safety of other drivers, cyclists and pedestrians at risk.
- Congested roadways adversely affect bus service.

In terms of the above, "Do Nothing" is environmentally inferior to the "Expand and Upgrade Existing Roads" solution. Therefore, the Do Nothing is not considered to be an acceptable alternative and was set aside.

5.2.7 Summary of Alternative Solutions

A summary of the evaluation of alternative solutions is illustrated in Table 5.1.

Table 5.1 Summary Evaluation of Alternative Solutions

Alternative	Acceptable / Not Acceptable
Transit	Not Acceptable (but would enhance the preferred solution)
Limit or Manage Growth	Not Acceptable
Divert Traffic to Other Roads	Not Acceptable
Build New Roads	Not Acceptable
Expand and Upgrade Existing Roads	Acceptable - Preferred Solution
Do Nothing	Not Acceptable

5.3 Network Options

Network Options are derived from the preferred solution, i.e. the Expansion and Upgrading of Existing Roads and are comprised of combinations of road widening, reconstruction, and resurfacing projects. The intention is to identify a set of options and determine which would best address the identified problems and best make use of the opportunities.

Since there are endless combinations of network options, the development and evaluation of network options was undertaken in two-steps. The first step was a preliminary screening of possible options that address issues of road capacity and road safety using a set of guiding principles for roadway planning (see Section 5.3.1). The purpose of the first stage is to ensure that only reasonable options are considered for detailed analysis and evaluation. Issues that could not be resolved using the guiding principles went to the next step and formed the framework for a set of road widening options carried forward to a more detailed evaluation using a set of evaluation criteria (see Section 5.3.2).

The road widening options were evaluated for their transportation benefits and effects on the natural, social, economic, and cultural environments. The result of the evaluation is the identification of the technically preferred network option and includes an Implementation Plan that considers funding availability, land use development and plans for infrastructure improvement (sewers, watermains etc.).

5.3.1 Guiding Principles for Roadway Planning

To identify a manageable group of network options for analysis and evaluation a set of basic guiding principles was developed. These principles make it possible to screen out options that at first glance would be considered acceptable but upon closer examination would not address the goals and objectives of traditional road planning practiced by the Municipality.

The guiding principles were developed based on traditional planning techniques that consider the benefits and impacts on both travel patterns and the social environment when planning for changes to roads. They are focused primarily on how road capacity, road safety, and adjacent land uses would be affected.

Road condition was not included as a parameter because road condition and its effects are more a function of the necessity to maintain roads over time. Therefore, road condition and the timing of related improvements are independent of the process that identifies the preferred network. An implementation plan will be developed following the identification of the technically preferred network option.

The basic guiding principles identified for this study are as follows:

- Consider the widening of major arterial roads (36m right-of-way) over minor arterial roads (30m right-of-way).
- Consider the widening of north-south arterial roads with access to the Linc, and access to the escarpment crossings, over roads without access to these facilities.
- Consider the widening of arterial roads with limited access (both roadway and driveway) and reverse frontage adjacent residential development over arterial roads with unlimited access and driveway access.
- Consider the widening of arterial roads with predominantly commercial/industrial adjacent development over residential/institutional.
- Put a priority on the upgrading of arterial roads sections considered to be incomplete/inconsistent with adjacent sections of the same road if the road function is impaired by the inconsistency.
- Consider existing safety problems as a priority for remediation in the short-term.
- Consider a minor expansion of existing two-lane arterial roads to three lanes in corridors where the addition of a Two-Way Left-turn Lane (TWLTL) would improve traffic operations, safety, and accessibility.

5.4 Identification of Road Widening Improvements

Application of the guiding principles resulted in a list of sites where safety issues need to be addressed and a set of 14 roadway widening improvements that would form the basis of the preferred network option. A description of the roadway sections and the rationale for the improvements is summarized below. They are illustrated in Exhibit 5.1.

5.4.1 Addressing Identified Safety Concerns

Section 4.3.3 identified several road sections and intersections where there is a collision problem. A key guiding principle states that existing safety problems should be considered as a priority for remediation in the short-term

In that regard, the following locations should be investigated to determine the appropriate remedial action:

i) Road Sections

- Mohawk Road - Upper Paradise Road to Garth Street
  - Upper James Street to Upper Wellington Street
- Upper Paradise Road - Vicinity of St. Thomas More School south of Stone Church Road
- Rymal Road - West 5th Street to Upper James Street

ii) Intersections

- Upper James Street at Chipman Avenue/Blossom Lane
- Upper James Street at Stone Church Road
- Mohawk Road at Upper Wentworth Street
- Mohawk Road at Upper Ottawa Street

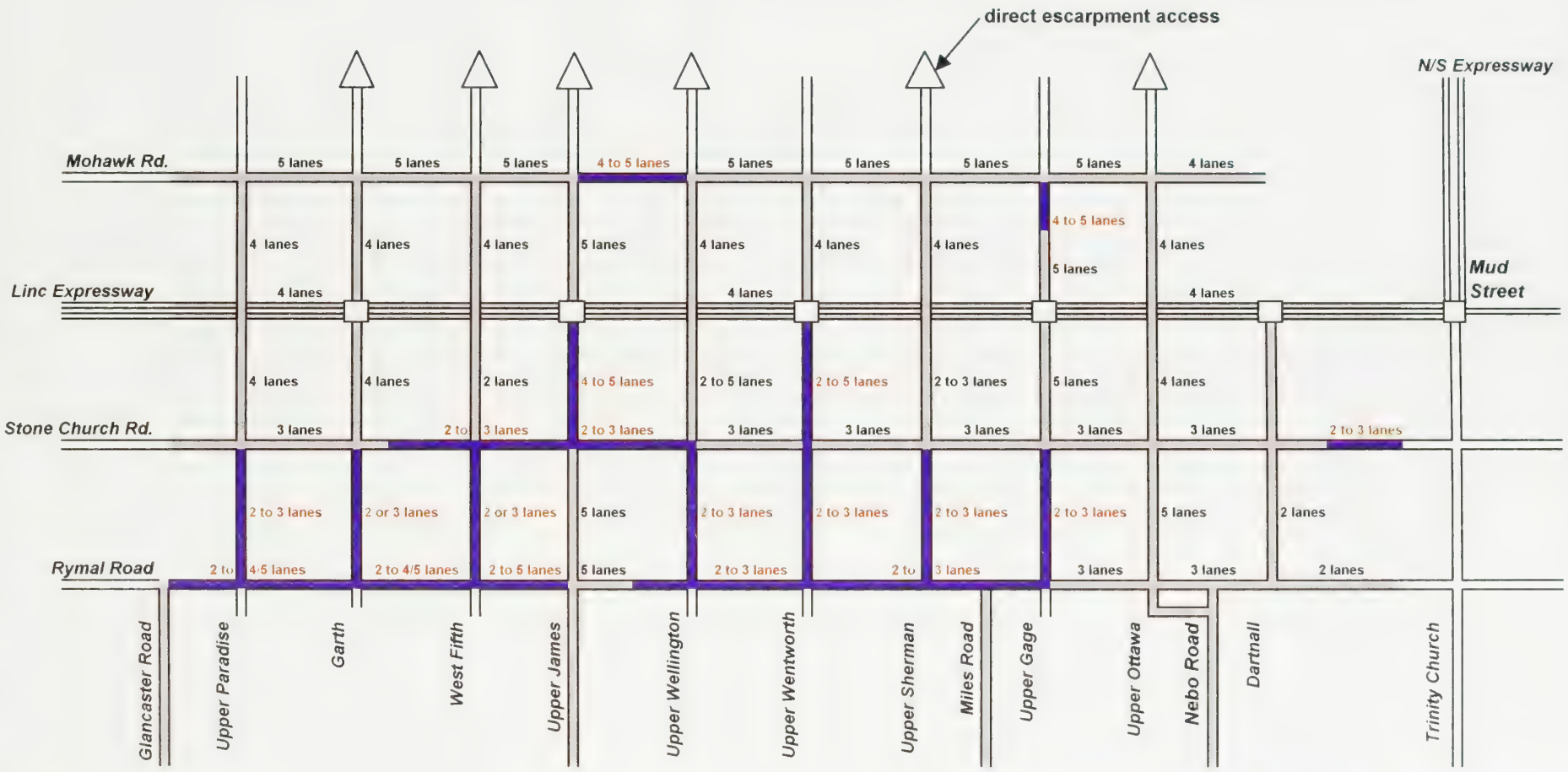
Some of the locations noted above may be improved as part of road improvement projects identified in the subsequent sections.

5.4.2 Upper James to Upper Wentworth Travel Corridor - Capacity Deficiency between Stone Church and the Linc

i) Upper James Street - Stone Church Road to the Linc

Upper James Street, at four lanes, experiences significantly high p.m. peak hour traffic in the southbound direction as it serves both as the major north-south commuter route and the commercial areas. The road cross-section of five lanes north and south of this section should be maintained to provide a consistent cross-section for the length of the corridor and to improve traffic operations.

As such, the upgrading of Upper James Street between Stone Church Road and the Linc to a 5–lane cross-section can be considered as a necessary improvement applied to all network options.



SOUTH MOUNTAIN AREA TRANSPORTATION MASTER PLAN STUDY

Exhibit 5.1

2 or 3 lanes — Widening/Reconstruction projects identified through application of the Guiding Principles

4 lanes — Existing Number of Lanes

ROADWAY WIDENING IMPROVEMENTS

ii) Upper Wentworth Street and Upper Wellington Street - Stone Church Road to the Linc

Both of these roads have a short-term capacity deficiency that can be addressed with the addition of one lane in each direction along one of the roadways. Upper Wentworth Street is a major arterial roadway with a 36m right-of-way, reverse frontage, limited access (no driveway access), and has a connection to the Linc. Conversely, Upper Wellington Street is a minor arterial, with a 30m right-of-way, unlimited driveway access, more trees, adjacent land uses that include residential, an old age home and a church, and no connection to the Linc (but has a connection to the Jolley Cut).

Based on the guiding principles, Upper Wentworth Street is a more logical corridor for expansion and will therefore be considered as the only location for road expansion to address the noted short-term capacity deficiency.

5.4.3 Stone Church Road to Rymal Road Travel Corridor - Capacity Deficiency from the West City Limits to West 5th Street

As a result of growth on the South Mountain and growth planned for the Meadowlands area, east-west travel demand in this corridor will exceed the practical capacity of the two roads in the long term. The demand is such that it is not likely that significant diversion will occur to the Linc because of the local nature of trips and the out-of-the-way travel needed to divert. Therefore, additional capacity of one lane in each direction is required to address the problem.

Rymal Road (former Provincial Highway 53) is a predominantly two-lane arterial roadway (four/five lanes between Upper James and Upper Wellington) that connects Highway 2 in Ancaster to Highway 20 in Stoney Creek through Hamilton. Prior to the opening of the Linc it was considered as the major east-west Regional facility on the Mountain carrying over 20,000 vehicles per day. Rymal Road has a 36m right-of-way and is characterized by scattered roadside trees, a mix of older residential homes with driveway access, newer residential with reverse frontage, a large retirement village, retail development clustered around the major intersections and commercial/industrial development east of Upper Gage.

A traffic impact study prepared for the Meadowlands Class Environmental Assessment Master Plan suggests that Rymal Road needs to be widened to four lanes in Ancaster.

Stone Church Road is for the most part a three-lane minor arterial roadway with a 30m right-of-way that connects Golf Links Road in Ancaster to Paramount Drive/Mud Street in Stoney Creek. West of Upper Ottawa Street, roadside development is predominantly newer residential with driveway access. Large trees adjacent to the road characterize the area west of Upper Wellington Street. The "Stone Church Road - Garth Street to Upper Mount Albion Road Schedule 'C' Class Environmental Assessment" was completed and subsequently approved in 1995 for the widening of this section from two to three lanes.

In light of the guiding principles, the wide right-of-way width, type of roadside development, the existing four/five-lane cross-section, and future development in both Ancaster and Stoney Creek make Rymal Road the most appropriate choice for a future widening in the long term. Therefore, the widening of Rymal Road from the limit of the four-lane section recommended as part of the Meadowlands development to West 5th Street will be considered as the only location for road expansion to address the noted long-term capacity deficiency

5.4.4 Rymal Road - Road Condition and Operational Deficiency from Springside Drive to Upper Gage Avenue

This section of Rymal Road is situated in an area that was primarily rural but has in the last 10 to 15 years experienced considerable growth and urban development adjacent to the roadway. Today, a combination of truck traffic, large number of vehicles turning into entrances, and vehicles making frequent stops have reduced the ability of the road to provide the safe and efficient movement of vehicles.

To address these deficiencies, the Rymal Road - West 5th Street to Upper Gage Avenue Schedule 'C' Class Environmental Assessment was completed and subsequently approved in 1995 for the widening of this section from 2 to 3 lanes. The potential environmental impact of the recommended plan is minimal and the public in general supported the need for the improvement.

In terms of this study, the guiding principles confirm the rationale for the project. The problem along Rymal Road cannot be resolved with improvements in other corridors because they relate to traffic operations, accessibility, and safety. In addition, the improvement would not be expected to change existing travel patterns. Therefore, Rymal Road can be considered as a necessary improvement applied to all network options.

5.4.5 Mohawk Road - Operational Deficiency from Upper James Street to Upper Wellington Street

Mohawk Road is a major arterial road that serves primarily local traffic since the opening of the Linc in 1997. Daily traffic volumes between West 5th Street and Upper Gage Avenue are typically in the 20,000-27,000 vehicle range with peak hour volumes in the 1,900-2,800 vehicle range.

There exists both an operational and safety deficiency through this four-lane section that will worsen in the medium term with the expected growth in traffic. The lack of left-turn lanes contributes to congestion and driver frustration during peak conditions because of direct driveway access for approximately 56 homes. Because access to these homes must be made from the inside lane there is an increased risk for rear end collisions.

The addition of a centre left-turn lane from Hayden Street to east of Dodson Street would resolve both the safety issue and improve traffic operations and accessibility by removing left-turning vehicles from the traffic stream. The improvement would also make the roadway a consistent five lanes wide from West 5th Street to Upper Ottawa Street and would not affect travel patterns.

Therefore, Mohawk Road from Upper James Street to Upper Wellington Street can be considered as a necessary improvement applied to all network options.

5.4.6 Upper Gage Avenue - Mohawk to Thorley Drive/Edwina Place

Upper Gage Avenue is a major arterial road with a connection to the Linc. With this connection it serves both local and regional traffic. From Mohawk Road to Thorley Drive/Edwina Place is four lanes and one of the busiest sections of road with daily traffic volumes at approximately 21,800 vehicles in 1998.

There exists a minor operational deficiency through this section that will worsen in the medium term with the expected growth in traffic. The lack of a left-turn lane for adjacent driveways to about 40 single-family dwellings contributes to congestion and driver frustration during peak conditions. In addition, because left-turn access to these homes must be made from the inside lane, there is an increased risk for rear end collisions.

The addition of a centre left-turn lane would resolve both this safety issue and improve traffic operations and accessibility by removing left-turning vehicles from the traffic stream. The improvement would also make the roadway a consistent five lanes wide from Mohawk Road to Stone Church Road and would not affect travel patterns.

Therefore, Upper Gage Avenue from Mohawk Road to Thorley Drive/Edwina Place can be considered as a necessary improvement applied to all network options.

5.4.7 Stone Church Road - Road Condition and Operational Deficiency

i) Garth Street to Upper Wellington Street

This section of Stone Church Road is a two-lane rural asphalt roadway situated in an area that is predominantly residential. Road condition is generally Poor-Fair and drainage in particular is a concern as the ditches either don't function as intended or are non-existent. Stone Church Road is also an integral part of the bike network. This section is the last unfinished link as Stone Church Road to the east and west has been reconstructed to include designated bike lanes. These problems, in addition to approximately 110 driveway accesses, contribute to operational, accessibility, and safety concerns.

As noted, the "Stone Church Road - from Garth Street to Upper Mount Albion Road Schedule 'C' Class Environmental Assessment" approved in 1995 for the widening of this section from two to three lanes to address these deficiencies. Public concern for the project can be summarized as the need to maintain and enhance the neighbourhood characteristics along the road. This includes the importance of pedestrian and cycling safety, volumes and speed of traffic, and tree preservation and enhancement. The recommended plan included the development of a Landscaping Plan.

In terms of this study, the guiding principles confirm the rationale for the project. The problem along Stone Church Road cannot be resolved with improvements in other corridors because they relate to road condition, drainage, operations, accessibility, and safety. In addition, the improvement would not be expected to change existing travel patterns, would improve on-street bike route, and would provide a consistent cross section for the length of the corridor.

Therefore, Stone Church Road from Garth Street to Upper Wellington Street can be considered as a necessary improvement applied to all network options.

ii) Arbour Road to Upper Mount Albion Road

This section of Stone Church Road is situated in an area that designated commercial/industrial. The road condition is generally Poor-Fair and requires reconstructing. The section of roadway was covered as part of the Stone Church Road EA as described above and approved for reconstructing from two to three lanes from Arbour Road to Pritchard Road and two lanes from Pritchard Road to Upper Mount Albion Road with paved shoulders.

In terms of this study, the Guiding Principles confirm the rationale for the project. The problem along Stone Church Road cannot be resolved with improvements in other corridors because they relate primarily to road condition. Through this section, the improvement:

- would extend the on-street bike route to Stoney Creek as per the Cycling Plan
- would not be expected to change existing travel patterns
- would improve traffic operations, accessibility, and safety
- would provide a consistent cross section for the length of the corridor

Therefore, Stone Church Road from Arbour Road to Upper Mount Albion Road can be considered as a necessary improvement applied to all network options.

5.4.8 North-South Roads South of Stone Church Road

i) Upper Paradise Road

Upper Paradise Road south of Stone Church Road is a rural two-lane asphalt road. Residential development is occurring on both sides of the roadway and houses will have driveway access onto the road. St. Thomas More is a Catholic Secondary School located mid-block on the east side of the road. Road condition is rated Fair-Good but road cuts necessary to install water and sewer services for new residential development have worsened road conditions. In addition, poor internal and access road design at St. Thomas More causes congestion problems in the morning peak period.

Reconstructing and widening this section of road to 3 lanes would resolve the deficiencies in road condition. The centre turn lane would improve accessibility to all land uses, and thereby improve safety, but would not be expected to change existing travel patterns. The plan could also include bike lanes. With additional local improvements in the vicinity of the school, the congestion problem would also be eliminated.

Therefore, Upper Paradise Road south of Stone Church Road can be considered as a necessary improvement applied to all network options.

ii) Garth Street

Garth Street south of Stone Church Road is a rural two-lane asphalt road. It has a connection to the Linc but is considered a minor arterial road with daily traffic volumes in the 7,500 to 8,000 vehicle range south of Stone Church Road. Traffic volumes are expected to double in the next 20 years but the road would still operate with a good Level of Service.

The road condition is considered to be Fair-Good and there are no other noted deficiencies. This section would require reconstruction in the 8-10 year time frame and benefit from a centre turn lane for improved traffic operations and accessibility. Improvements on other roads would not eliminate the need to upgrade this road in the future.

Therefore, Garth Street south of Stone Church Road can be considered as a necessary improvement applied to all network options.

iii) West 5th Street

West 5th Street south of Stone Church Road is a rural two-lane asphalt road and is part of the bicycle route network. It is considered a minor arterial road with daily traffic volumes of approximately 5,500 vehicles south of Stone Church Road. Traffic volumes are expected to increase by approximately 70% in the next 20 years not accounting for a recently proposed Multi Pad Complex at Connell Park on the west side of the road.

This proposed park facility will include four ice rinks, soccer fields, baseball diamonds, and a restaurant/bar. It is not anticipated that this development will generate traffic that would require the road to be widened to four lanes. A traffic impact study should, however, be prepared to verify this as part of the planning process for the project.

The road condition is considered to be Good and there are no other noted deficiencies. This section will likely require reconstruction in the 8-10 year time frame unless the Multi-Pad Complex is built sooner, then at least the section of road from the park entrance to Stone Church Road should be advanced to follow the development. The section south of the park should also be upgraded to follow development as it proceeds.

In terms of the park development and the Neighbourhood Plan, this section would benefit from a centre-turn lane and bike lanes for improved traffic operation and accessibility. Improvements on other roads would not eliminate the need to upgrade this road in the future, therefore, West 5th Street south of Stone Church Road can be considered as a necessary improvement applied to all network options with the timing of the improvement to follow development.

iv) Upper Wellington Street

Upper Wellington Street south of Stone Church Road is a rural two-lane asphalt road. It is considered a minor arterial road with daily traffic volumes of approximately 5,000 vehicles south of Stone Church Road. Traffic volumes are expected to increase by approximately 30-40% in the next 20 years but the road would still operate with a good Level of Service.

The road condition is considered to be Fair and there are no other noted deficiencies except deficiencies in the sidewalk. This section will require reconstruction in the six-eight year time frame and would benefit from a centre turn lane for improved traffic operations and accessibility.

Improvements on other roads would not eliminate the need to upgrade this road in the future, therefore, Upper Wellington Street south of Stone Church Road can be considered as a necessary improvement applied to all network options.

v) Upper Sherman Avenue

Upper Sherman Avenue south of Stone Church Road is a rural two-lane asphalt road. It is considered a minor arterial road with daily traffic volumes of approximately 5,500 vehicles south of Stone Church Road. Traffic volumes are expected to increase by approximately 20% in the next 20 years but the road would still operate with a good Level of Service.

The road condition is considered to be Fair and there are no other noted deficiencies except deficiencies in the sidewalk. This section will require reconstruction in the six-eight year time frame and would benefit from a centre turn lane for improved traffic operations and accessibility.

Improvements on other roads would not eliminate the need to upgrade this road in the future, therefore, Upper Sherman Avenue south of Stone Church Road can be considered as a necessary improvement applied to all network options.

vi) Upper Gage Avenue

This section of Upper Gage Avenue is situated in an area that is predominantly residential, with about half being reverse-frontage and half with driveways adjacent to the roadway. Road condition is Fair and there is a noted operations deficiency with vehicles passing on the shoulders to bypass turning or stopped vehicles. There is an added safety concern as discontinuous sidewalk results in pedestrian activity along the shoulders, which conflicts with traffic. Driver safety is also compromised because left turns into approximately 45 driveways must be made from the through lane increasing the risk of rear end collisions.

To address these deficiencies, the "Upper Gage Avenue - from Thorley Drive/Edwina Place to Rymal Road Schedule 'C' Class Environmental Assessment" was completed and subsequently approved in 1993 for the widening of this section from two to five lanes. The public generally supported the project.

However, travel demand forecasts for this study indicate that in the next 20 years, a two-lane road in this section would provide a good Level of Service. Because of the unlimited access, it would also benefit from a centre turn lane for improved traffic operations and accessibility and safety.

In terms of this study, the guiding principles confirm the rationale for the project. The problems along Upper Gage Avenue cannot be resolved with improvements in other corridors because they relate to road condition, operations, accessibility, and safety. In addition, the improvement would not be expected to change existing travel patterns.

Therefore, a three-lane Upper Gage Avenue south of Stone Church Road can be considered as a necessary improvement applied to all network options.

Summary

The application of Guiding Principles resulted in the identification of fourteen road widening improvements to solve noted transportation problems in the South Mountain Area. The improvements are illustrated in Exhibit 5.1. These improvements form the basis of the Preferred Network Option.

5.5 Roadway Widening Options

A north-south traffic congestion problem south of the Linc and north of Stone Church Road between West 5th Street and Upper Sherman Avenue could not be resolved using the guiding principles.

In the long term, there will be a capacity shortfall in both peak periods in this corridor resulting in a Level of Service 'F'. The addition of one lane in each direction (i.e. a widening of a road) will resolve the deficiency. As a result, three additional roadway widening options were identified and evaluated (see Exhibit 5.2). These include:

- Option A - Upper Wellington Street
- Option B - West 5th Street
- Option C - Upper Sherman Avenue

The widening of Upper James Street and Upper Wentworth Street were initially considered as possible roads to widen in addition to the three above. However, they have already been identified for widening to five lanes in the short term. The widening of these roads from five to seven lanes presents three problems. First, the bridges over the Linc would have to be widened and the ramps reconstructed. Second, the widening of Upper James Street would result in significant impacts to roadside business access and parking arrangements. Third, the widening of Upper Wentworth Street would have a significant socio-economic impact as it extends through a predominantly residential area that includes a park. Therefore, Upper James Street and Upper Wentworth Street were not considered for widening.

The evaluation assumed that with one of the above roads selected for widening to five lanes, the remaining two would need upgrading to two or three lanes.

5.5.1 Evaluation Criteria

In order to select the best road for widening, Options A, B, and C were evaluated for potential impacts on the natural, cultural, socio-economic and transportation environments using a defined set of evaluation factors and indicators to assess the most suitable road for widening. The following is the list of factors and the indicators used to evaluate the potential effect of the roadway widening options on the environment.

i) Natural Environment

- Vegetation/Landscaping Removal (Trees Removed)

ii) Cultural Environment

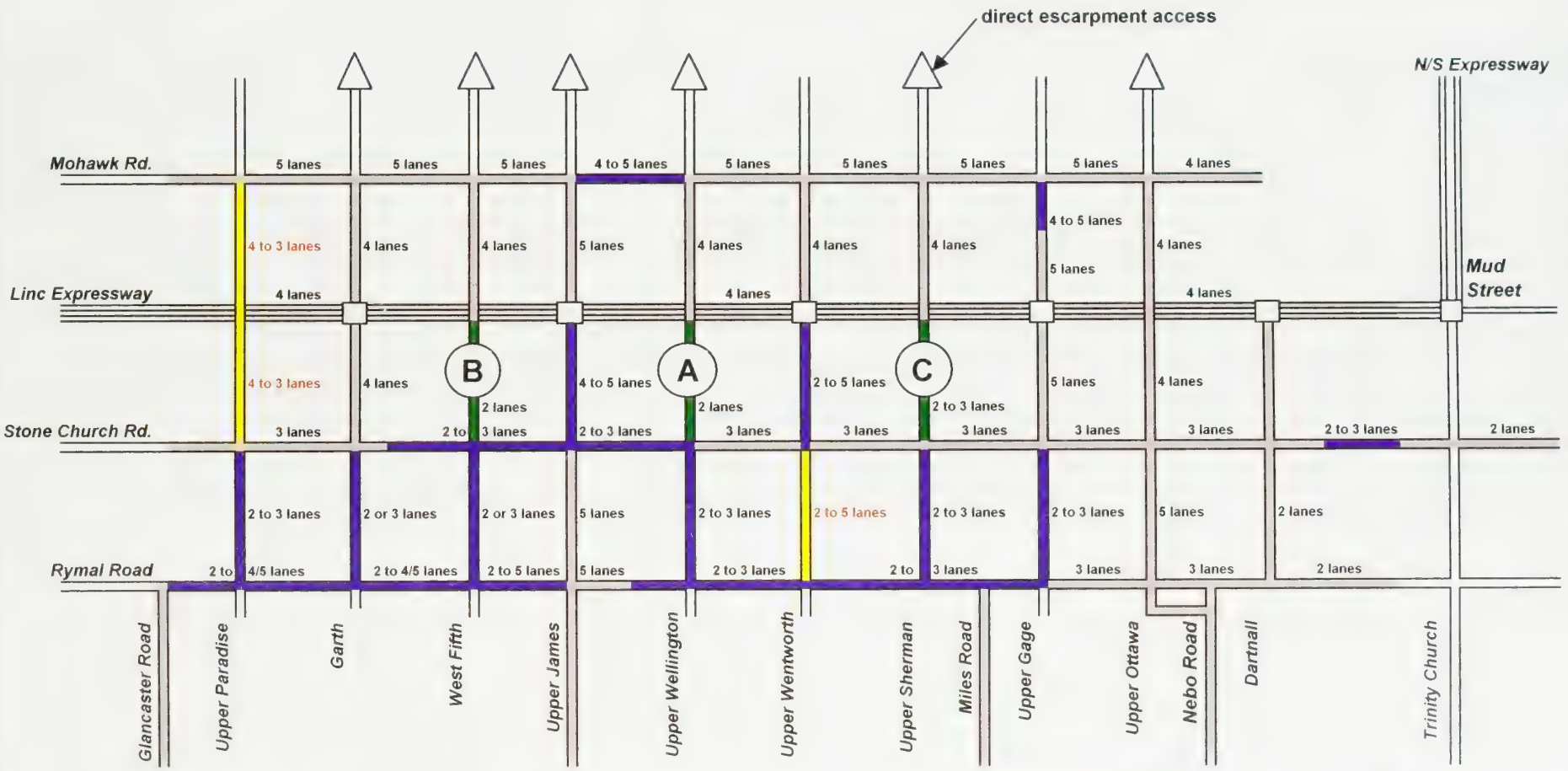
- Direct and/or Indirect Effect on Heritage Resources

iii) Economic Environment

- Impact On Access To Adjacent Commercial Uses
- Impact On Areas Designated For Future Development

iv) Social Environment

- Number Of Properties Potentially Affected
- Number Of Residences Adjacent To The Right-Of-Way
- Number Of Institutional Uses Potentially Disrupted
- Number Of Recreational Uses / Trails Potentially Affected
- Potential Changes In Existing Noise Levels
- Potential Changes In Existing Air Quality Levels
- Potential For Community / Neighbourhood Disruption



SOUTH MOUNTAIN AREA TRANSPORTATION MASTER PLAN STUDY

Exhibit 5.2

B — Road Widening Options (2 to 4 or 5 Lanes)

4 to 3 lanes — Opportunities to Enhance the Network

2 to 5 lanes — Widening/Reconstruction Projects Identified through application of the Guiding Principles

4 lanes — Existing Number of Lanes

ROADWAY WIDENING OPTIONS AND OTHER OPPORTUNITIES

v) Transportation

- Network Level Of Service And Network Flexibility
- Effect On Travel Patterns
- Accessibility To The Linc, Escarpment, Bike Routes, And HSR
- Number Of Entrances
- Number Of Driveways
- Truck Route Designation
- Right-Of-Way Width
- Bicycle Network And Safety
- Effect On Transit Service, Future Flexibility And Safety

5.5.2 Evaluation of Option A, B, and C

The analysis and evaluation of Option A, B, and C is documented in Table 5.2 in terms of their impacts on the environment and transportation benefits. Upper Wellington Street was identified as the best choice for widening to four/five lanes for the following reasons:

- It would have the least impact on existing neighbourhoods and residential uses adjacent to the roadway. In addition to the fewest houses along the road, the area is in transition with respect to land use, whereas both other roads have established roadside development.
- In terms of travel demand, Upper Wellington Street is centred well in the corridor of demand and provides the greatest opportunity for route selection and possible diversion from more congested routes.
- It is potentially the safest option in terms of the limited number of access points and it is not on a bike network route.

As a result, the analysis, in conjunction with the guiding principles, indicate that West 5th Street should be reconstructed as a two-lane road and that Upper Sherman Avenue be reconstructed as a three-lane road from Stone Church road to the Linc.

Network Option A would best address the existing and future transportation requirements for the South Mountain over the long term, therefore it is recommended that it be included as part of the Technically Preferred Network Option.

5.6 Transportation Opportunities

As noted in Section 4.2, in addition to finding solutions for the identified problems, opportunities would also be considered if the opportunity avoided jeopardizing safety or roadway operations. Opportunities present themselves as follows:

- those that arise in a corridor as a result of the need to make other improvements; and
- become apparent in a corridor as a result of the need to make improvements in another corridor.

The assessment of traffic and resolving of problems presented two significant opportunities (see Exhibit 5.2):

- Widening Upper Wentworth Street to four or five lanes south of Stone Church to Rymal
- Reducing Upper Paradise Road from four lanes to three lanes and re-striping to include bike lanes

Table 5.2 Analysis and Evaluation

Factor / Indicator	Do Nothing	Option A Upper Wellington to 4/5 Lanes; (West 5th & U. Sherman at 3 Lanes)	Option B West 5th to 4/5 Lanes; (U. Wellington & U.Sherman at 3 Lanes)	Option C Upper Sherman to 5 Lanes; (West 5th & U. Wellington at 3 Lanes)
Natural Environment				
Vegetation/Landscaping Removal (Trees removed)	No impact would occur to roadside vegetation.	31; (Landscape plan would be implemented)	57; (Landscape plan would be implemented)	41; (Landscape Plan would be implemented)
Cultural Environment				
Direct and /or Indirect Effect on Heritage Resources	No impact.	No impact	Area of Archaeological Potential	Area of Archaeological Potential
Economic Environment				
Impact on Areas Designated for Future Development	New neighbourhood development may be less preferred if road access unimproved	Corridor being extensively redeveloped.	Some infill development occurring in corridor	Corridor is fully developed
Impact on Access to Adjacent Commercial Uses	Congestion would make access to local commercial operations less efficient	Improves access to commercial development north of Linc	No commercial operations within corridor New recreational development to South	No commercial operations within corridor
Social Environment				
Total Number of Properties Potentially Affected	No properties would be required	32 properties affected	53 properties affected	0 properties affected
Number of Residences Adjacent to Right-of-Way	No residential properties would be affected	41 residences along the right-of-way	72 residences along the right-of-way	65 residences along the right-of-way
Number of Institutional Uses Potentially Disrupted	No institutional uses would be affected	2 Churches and 2 Retirement Homes would be affected	No institutional uses would be affected	1 Church would be affected
Number of Recreational Uses/Trails Potentially Affected	No recreational uses would be affected	No recreational uses affected	Improved access to William Connell Park	1 Multi-use path crossed
Changes in Existing Noise Levels	No increase in noise levels would occur	No significant changes anticipated	No significant changes anticipated	No significant changes anticipated
Changes in Existing Air Quality Levels	Increased congestion would result in increased air quality problems	No significant changes anticipated	No significant changes anticipated	No significant changes anticipated
Potential for Community/ Neighbourhood Disruption	Lack of improvement will result in traffic congestion	Area is in transition. Minimal disruption will result to neighbourhood	Improvements will dramatically change streetscape and neighbourhood	Development setback from road corridor Minimal effect on neighbourhood
Transportation				
Network Level of Service and Network Flexibility	The practical capacity of the roadways in this corridor would be exceeded in the p.m. peak hour resulting in an unacceptable Level of Service (E/F)	The screenline capacity of the roads in this corridor would exceed demand Level of Service on both **U. James** and **U. Wentworth** would improve from Stone Church to Mohawk. Level of Service would be good (C/D) across the corridor	The screenline capacity of the roads in this corridor would exceed demand Level of Service on **U. James** would improve from Stone Church to Mohawk Level of Service would be good (C/D) across the corridor	The screenline capacity of the roads in this corridor would exceed demand Level of Service on **U. Wentworth** would improve from Stone Church to Mohawk Would also improve Level of Service on **Upper Gage** north of the Linc Corridor Level of Service would be good (C/D)

Table 5.2 Analysis and Evaluation (Cont'd.)

Factor / Indicator	Do Nothing	Option A Upper Wellington to 4/5 Lanes; (West 5th & U. Sherman at 3 Lanes)	Option B West 5th to 4/5 Lanes; (U. Wellington & U.Sherman at 3 Lanes)	Option C Upper Sherman to 5 Lanes; (West 5th & U. Wellington at 3 Lanes)
Transportation (Cont'd.)				
Effect on Travel Patterns (Ability to divert traffic, Effect on Parallel Roads etc)	Capacity shortfall would result in congested roadways for longer time periods. Traffic will begin to divert to other less desirable routes including infiltrating neighbourhoods	U Wellington provides the opportunity for route selection to the most users in that it is in the middle of the corridor where the capacity shortfall exists. i.e. traffic on U James (travelling north - south and east) and U. Wentworth (north – south and west) can divert without much out-of-the way travel or time loss. Would provide good spacing between high volume 4 lane roads. Also has the potential to spread out the demand more evenly north of the Linc from U. James to U. Gage	Close proximity to Upper James provides good opportunity for traffic to divert from Upper James but potential is limited to local commuter traffic that is ultimately heading west, therefore ability to significantly reduce demand on U. James north of Linc is unlikely. Likely no effect on Garth Street. May result in higher volumes on West 5th north of the Linc	The potential for diversion would not address the capacity shortfall along U James although proximity to U Gage provides opportunity for traffic travelling north -south and west to divert and would reduce demand on U Gage and U Wentworth between Linc and Mohawk U Gage has been identified as a possible problem area
Accessibility -Linc -Escarpment -Bike Routes -HSR a) Major Connections -Lime Ridge -Downtown -Mohawk b) Wheelchair Accessible Buses	 n/a n/a n/a n/a	 No Yes No 1 Route Yes Yes No Yes	 No Yes Signed Bike Route 1 Route No Yes Yes Yes	 No Yes On-street Bike Route 1 Route No Yes No No
Number of Entrances	n/a	2	2	6
Number of Driveways	n/a	29	68	33
Truck Route Designation	n/a	No	No	No
Right-of-way Width	n/a	30	30	30
Bicycle Network and Safety (Effect of improvement on the existing bicycle network and on overall bicycle safety on adjacent routes)	Risk to cyclists increases as with increased traffic congestion and substandard road cross-section for bike routes	Effect of widening would have no effect on the existing Bike network; bike safety on road itself may be improved because of lower vehicle/lane densities and the inclusion of design considerations that accommodate bikes. Public perception would be somewhat negative to a 4-lane roadway as a bike route compared to a 2-lane roadway	Potential for improved bike safety because of lower vehicle/lane densities would be offset by the increased potential for conflict of cyclists turning left at major intersections Public perception would be somewhat negative to a 4-lane roadway as a bike route compared to a 2-lane roadway	Potential for improved bike safety because of lower vehicle/lane densities would be offset by the increased potential for conflict of cyclists turning left at major intersections. Public perception would be somewhat negative to a 5-lane roadway as a bike route compared to a 2-lane roadway
Effect on Transit Service, Future Flexibility and Safety (Effect of improvement on transit policy to encourage higher usage and on the allowance of the planned expansion of the transit system.)	Increased congestion effects transit service. No improvements to capacity and reduces potential for expansion of service	No clear benefit to transit (i.e. additional lanes do not automatically translate into increased ridership or vastly improved on-street operation). Upper Wellington would be advantageous for public transit over the next 20 years. Development on both sides of this roadway section is further advanced than either West 5th or Upper Sherman. This development is creating transit trips currently. Typically, a 3-lane roadway is sufficient for effective bus operations. However, there is a potential for misuse of the centre lane by motorists	No clear benefit to transit (i.e. additional lanes do not automatically translate into increased ridership or vastly improved on-street operation). Not as good as U Wellington for public transit over the next 20 years. Typically, a 3-lane roadway is sufficient for effective bus operations However, there is a potential for misuse of the centre lane by motorists attempting to pass stopped buses attempting to pass stopped buses	No clear benefit to transit (i.e . additional lanes do not automatically translate into increased ridership or vastly improved on-street operation). Not as good as U Wellington for public transit over the next 20 years. Typically, a 3-lane roadway is sufficient for effective bus operations However, there is a potential for misuse of the centre lane by motorists attempting to pass stopped buses

5.6.1 Widen Upper Wentworth to Four/Five Lanes South of Stone Church to Rymal

i) Traffic Volumes

Daily traffic volumes are forecast to be in the 12,000-16,000 vehicle range, therefore a three-lane or four/five-lane roadway would provide adequate capacity over the 20-year time frame and would not be significantly different in terms of travel patterns.

ii) Flexibility

In terms of network flexibility, a four/five-lane road would provide flexibility in the system if unforeseen changes in land use results in higher traffic volumes. There would be an opportunity for north-south traffic to divert from Upper James Street in the event growth in external and retail trips in that corridor is greater than anticipated. However, the improvement itself would be expected to induce some new traffic, although to what degree is not foreseeable.

It would also provide long term flexibility in the timing of improvements on adjacent roads. The widening would provide enough capacity and good Level of Service such that the timing of reconstruction of both Upper Wellington Street and Upper Sherman Avenue could be delayed. A less expensive resurfacing would provide an acceptable interim solution to the deficiencies on these two roads and would ensure that development precedes any major road works. This would save the Municipality money in terms of Development Charges allocated to the reconstruction and land dedication from developers.

iii) Transit

The RTR (1996) identified Upper Wentworth Street as the major north-south transit corridor for future expansion. However, four/five-lanes through this section would not provide an additional benefit for transit within the planning horizon.

iv) Community

Land use adjacent to the corridor has been developed assuming Upper Wentworth Street as a major north-south transportation route. The right-of-way abuts the rear properties of residential development and provides limited side road access thereby minimizing impact on the adjacent communities.

Additional property would not be required for the four/five-lane option and the difference in noise would not be significant. Concerns with pedestrian safety and community links can be addressed with special features incorporated into the road design. The improvement would be beneficial to the network from the perspective of providing emergency services because it provides alternate route choices.

Therefore, it is recommended that a four/five-lane Upper Wentworth south of Stone Church Road be included as part of the Technically Preferred Network Option.

5.6.2 Re-Stripe Upper Paradise from Four to Three Lanes - Stone Church Road to Mohawk Road

Re-striping Upper Paradise Road from four to three Lanes (two lanes with centre-turn lane) with Bike Lanes would have a moderating effect on the street. There is the potential to improve safety and an opportunity to improve the streetscape with the change at a relatively low cost. The corridor could be enhanced further for all users by incorporating suitable traffic calming measures as anticipated slower traffic would make the road more pedestrian and cyclist friendly. There is also the potential to include street parking.

In terms of the bicycle network, the addition of marked bike lanes would consolidate the bike network on the west end of the Mountain and enhance the escarpment crossing points west of Upper Paradise Road on Scenic Drive and at the north end of Garth Street.

Daily traffic volumes are in the 10,000-13,000 vehicle range, which is fitting for a two-lane facility. Long-term forecast traffic volumes are estimated to increase by approximately 15% which in terms of the effect on Level of Service is not expected to be significant. If successful, these changes could be applied to the section north of Mohawk Road.

Therefore, it is recommended that Upper Paradise Road north of Stone Church be re-striped to three-lanes with designated bike lanes and included as part of the Technically Preferred Network Option.

5.6.3 Opportunities for Pedestrians and Cyclists

Section 4.3.3 indicated that there are no distinct problems with the pedestrian environment. Cycling activity is low partly because of the restricted street network of disjointed connections between adjoining subdivisions. Therefore, any opportunities for improvement as part of other road improvements should be taken advantage of.

Therefore, all identified road improvements will include consideration of improved bicycle and pedestrian facilities as part of the road design.

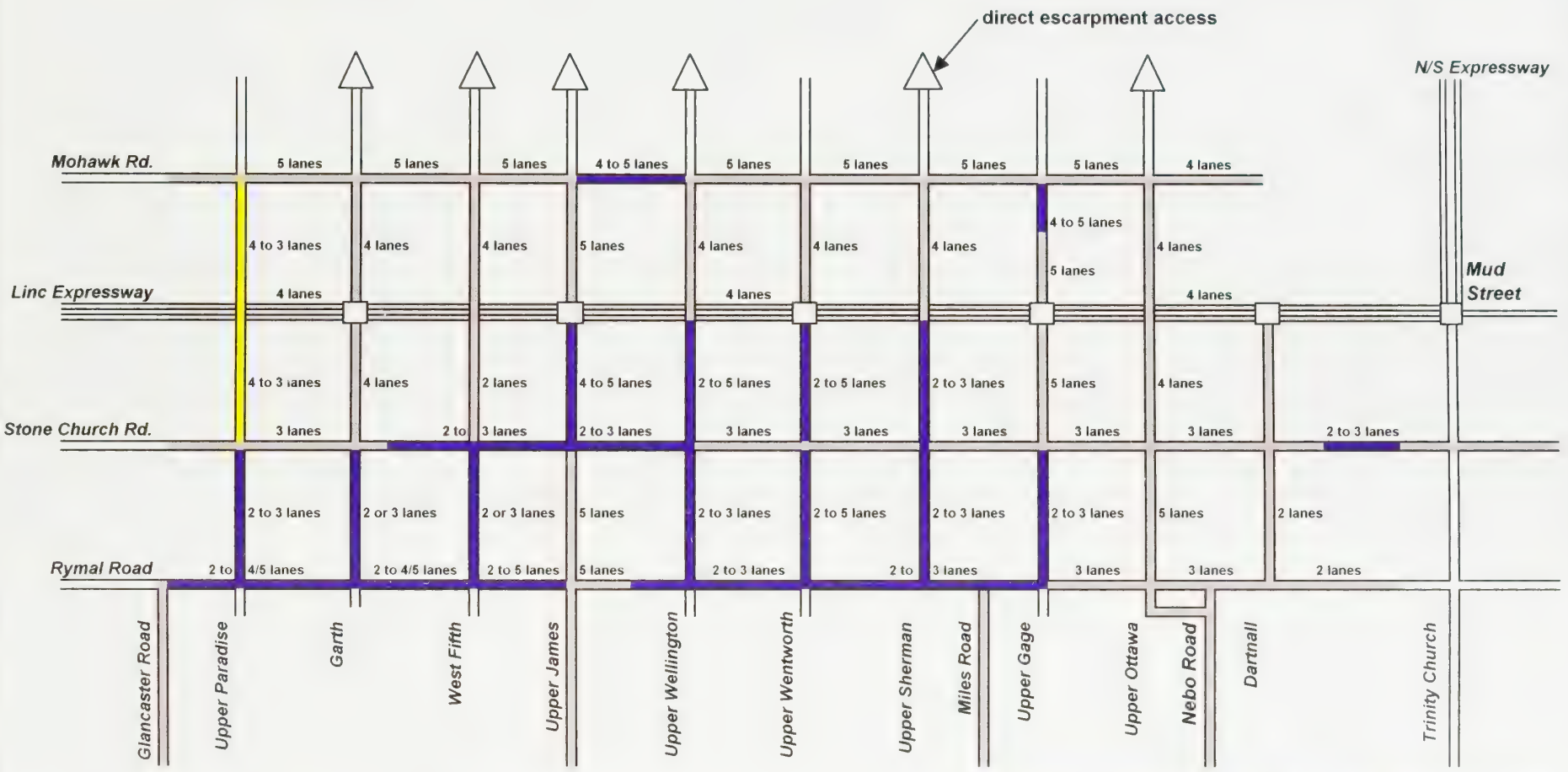
5.7 Technically Preferred Network Option

In summary, the technically preferred network option is comprised of:

- road widenings and reconstruction upgrades of 14 roads (refer to Section 5.4);
- the widening of Upper Wellington Street to four or five lanes from Stone Church Road to the Linc in the long-term (refer to Section 5.5); and
- a widening of Upper Wentworth Street to five lanes from Rymal Road to Stone Church Road (refer to Section 5.6.1);
- and a re-striping of Upper Paradise Road to three lanes from Stone Church Road to Mohawk Road with bike lanes (refer to Section 5.6.2); and
- addressing all safety concerns as identified in Section 5.4.1.

All improvements would include consideration of improved bicycle and pedestrian facilities as part of the road design (refer to Section 5.6.3).

The technically preferred network option is shown in Exhibit 5.3 in terms of ultimate lane configurations for all roads in the study area.



SOUTH MOUNTAIN AREA TRANSPORTATION MASTER PLAN STUDY

Exhibit 5.3

Widening/Reconstruction Projects

Resurfacing/Reconstruction Projects-No Widening

Pavement Reallocation (Re-striping) Project

Note: **All road projects to consider improvement to consider improvements to bicycle and pedestrian facilities as part of the road design.**

TECHNICALLY PREFERRED NETWORK OPTION

5.8 Implementation Plan

The components of the technically preferred network option were subject to further analysis to determine an Implementation Plan for the identified road projects. An implementation plan is required in order to understand the scope of road works required in terms of:

- The priority of the project (related to the importance of addressing safety issues, capacity needs and/or poor road condition)
- The cost of the project and funding availability (this related to the funds available to improve other roads across the Region as well)
- The timing of other related projects within the road right-of-way, such as watermain, storm sewer, and sanitary sewer works
- The timing of adjacent land use developments
- Property requirements

A number of steps were followed in the analysis to determine the most appropriate implementation plan.

1. **Road Condition** - The first step in the analysis was to identify a rough schedule for road projects based on road condition alone. This was done using the Road Condition data (refer to Section 4.3) and approximating when the useful service life of each road would end. The schedule was set on a yearly basis to the Year 2010; beyond that the projects were set into 5-year blocks, i.e. Years 2010-2015, and 2016-2021.
2. **Cost** - Road projects require a significant capital investment. Since the Roads Capital Budget is set yearly assuming a set dollar amount for the whole Region, the rough schedule was modified in some instances to show a more balanced spread of capital dollars being spent from 2000 - 2011. Using this approach, roads scheduled in a given year with a similar service life expectancy could be advanced or delayed by a year or two on a subjective basis.
3. **Safety Issues** - Addressing safety issues is considered a high priority and it is intended to attempt to resolve these issues in the short-term (one to five years). Therefore, the schedule for areas where there are existing safety issues (see Section 4.3) was adjusted. For example, a road scheduled for 2004 based on road condition alone, could be advanced anywhere from one to four years if the project itself would resolve the safety issue.
4. **Capacity Needs** - Capacity needs for SMA roads were determined in Section 4.2. The Upper Wentworth Street - Linc to Stone Church Road widening would address an existing deficiency so it is a high priority project. The other two widening projects (not including widenings for a centre turn lane), are long term, i.e. based on the travel demand information they need to be in place by Year 2021. It may be appropriate to advance these capacity related projects should the need to upgrade road condition be a priority.
5. **Infrastructure Projects** - Sewer and watermain installations and repairs etc. are planned for the South Mountain Area and similar to the objectives of this study, are being implemented to address growth in both the short and long term. In terms of disruption to drivers, costs, and service life expectancy of the road, it is desirable, where feasible, to coordinate infrastructure projects to occur at the same time as road projects. The Infrastructure Planning group has a clear plan for short-term improvements and the expected timing of each; therefore, road projects have been matched to the infrastructure projects where possible. This effort at balancing the work could result in either a road or infrastructure project being advanced or delayed.

6. **Land Development and Property Requirements -** As noted previously, it is desirable to improve a road after adjacent roadside development is complete. By adopting this approach lands required for the right-of-way are dedicated by the developer (and need not be purchased), and road cuts caused by services installations (hydro, water, etc.) can be avoided. Therefore, it was necessary to review the proposed timing of projects in terms of the extent of development. If development plans were unclear as to their timing, then an effort was made to delay the planned improvement to the road where possible. This was done either by simply delaying the project for a year or two or by identifying an interim improvement such as road resurfacing that would hold the road until development occurred.

   For short-term projects, it was also necessary to consider the time required for property acquisition. In the event that land needs to be expropriated, delay can often result. For projects planned for later years the acquisition of property can be advanced so that project construction is unaffected.

Based on the steps above, a timeline for implementation of projects was developed and is shown in Table 5.3. The proposed projects have been identified as those that should be completed year by year to 2005, by the Year 2011, and by the Year 2021.

5.9 Consultation

The rationale for and the extent of the technically preferred network option were presented to the local Ward Councillors (6, 7, and 8) prior to public presentation. The Ward Councillors expressed strong support for the preferred network and encouraged implementation of certain improvements as soon as possible.

At the second set of Public Information Centres held on February 16 and 17, 2000 the public favoured to the preferred network. Concerns received from the public related to specific issues on particular roads and not the plan as a whole. There were no significant concerns expressed with the overall approach in determining the Preferred Network. Specific comments/concerns provided by the public are presented in Appendix 'B'.

Subsequent to the second set of Public Information Centres minor modifications were made to the schedule of short-term projects. These changes are reflected in Table 5.3. The preferred network and implementation plan as outlined in Section 5.7 and 5.8 was approved by the Transportation Services Committee (TSC) on March 27, 2000 and subsequently adopted by Regional Council on April 4, 2000 (see Appendix 'B').

It should be noted that an April 4, 2000 Regional council resolution indicated Council's desire to complete the entire reconstruction of the Upper Wentworth project in 2000. The ability of completing the south section is dependent on funding availability and the practicality of finishing the project before the arrival of winter. This will be investigated further as part of the detail design phase.

Table 5.3 Implementation Plan

Road	Section	# Lanes		Year/Comment
		Existing	Future	
Short- Term (2000 –2005)				
Upper Paradise	Mohawk to Stone Church	4	3	2001 (re-stripe - to coincide with completion of Stone Church to Rymal)
	Stone Church to Rymal (north)	2	3	2001 (reconstruct; investigate further)
	Stone Church to Rymal (south)	2	3	2001-05 (reconstruct; to follow development)
West 5th	Stone Church to Rymal	2	2 or 3	To be re-assessed at the time of development of Connell Park in 2000/01)
	Mohawk to Linc	4	4	2000 (resurface)
Upper James	Linc to Stone Church	4	5	2001 (widen and resurface)
Upper Wellington	Stone Church to Rymal	2	2	2002-05 (resurface)
Upper Wentworth	Linc to Stone Church	2	5	2000 (reconstruct)
	Stone Church to Rymal	2	4/5	2000 or 2001 (reconstruct)
Upper Sherman	Stone Church to Rymal	2	2	2003 (resurface; coincides with sewer installations)
Upper Gage	Stone Church to Rymal	2	3	2001 (reconstruct; coincides with trunk watermain installation)
Mohawk Road	Upper Ottawa to Upper Kenilworth	4	4	2000 (resurface)
	Various collision locations	-	-	2000 or 2001
Stone Church	Garth to Upper Wellington	2	3	2002/03 (reconstruct)
	Arbour to Pritchard	2	3	2000 (reconstruct)
Rymal	West 5th to Upper James	3	5	2004/05 (widen and resurface)
	Springside to Upper Wentworth	2	3	2000 (widen and resurface)
	Upper Wentworth to Upper Gage	2	3	2000 (widen and resurface)
	Dartnall to Trinity Church	2	2	2001-05 (resurface)
Long – Term (Beyond 2005)				
Garth	Stone Church to Rymal	2	2 or 3	reconstruct by 2011
West 5th	Linc to Stone Church	2	2	resurface (with improved shoulders) or reconstruct as required by 2011
Upper Wellington	Linc to Stone Church	2	5	reconstruct by 2021; resurface as required in the interim
	Stone Church to Rymal	2	3	reconstruct by 2021
Upper Sherman	Linc to Stone Church	2	3	reconstruct with bike lanes by 2011
	Stone Church to Rymal	2	3	reconstruct by 2021
Upper Gage	Mohawk to Thorley/Edwina	4	5	widen and resurface by 2011
Rymal	Glancaster to West 5th	2	4/5	reconstruction by 2021
Mohawk	Upper James to Upper Wellington	4	5	widen and resurface by 2011

Notes:

(1) All other roads may need resurfacing or reconstruction, either to the existing 2 lanes or with a centre turn lane added

(2) All improvements will include the consideration of improved bike and pedestrian facilities.

6.0 The Recommended Transportation Master Plan

Chapter 5 concluded with the identification of the technically preferred network and implementation plan. They were vetted through public consultation and were subsequently endorsed by Regional Council as the Recommended Transportation Master Plan for the South Mountain without any significant changes (three minor changes to the implementation plan).

This Chapter describes the Recommended Transportation Master Plan and its components (see Section 6.1). It also describes the Plan in terms of EA approved projects and projects requiring additional approvals (see Section 6.2) and the Master Plan review process (see Section 6.3). Section 6.4 summarizes concerns/issues and commitments to future work.

6.1 Description of the Plan

The Recommended Transportation Master Plan for the South Mountain Area (SMA) consists of:

- road resurfacing projects;
- road widening and/or reconstruction projects;
- a pavement reallocation project; and
- several areas to be investigated for safety improvements.

The timing of these projects was developed as an implementation plan that weighed the importance of addressing safety issues, capacity needs and/or poor road condition, the cost of the project and funding availability, the timing of infrastructure projects and adjacent land use developments, and property requirements.

6.1.1 Timing of SMA Projects

The Plan is split into projects to be completed in the Short-Term (2000-2005) and Long-Term (2006-2021). The long-term projects are flexible in the timing of their implementation with indicated timeframes dictating only the year by which the project should be complete. The actual schedule of long-term projects will be set nearer to their indicated 'construction by' date. The timing of all projects is subject to the Roads Capital Budget which is set yearly and requires Council approval.

Should unforeseen changes occur it might be necessary to advance or delay certain projects. The necessity to change the timing as indicated has no influence on the ultimate network configuration, but changes in timing on one project could influence the timing on other projects (refer to Section 6.3).

Short-Term improvements are shown Exhibit 6.1. The Ultimate Network is shown in Exhibit 6.2. The implementation plan is described in Table 5.3.

6.1.2 Timing of Other Projects

The Municipality will be undertaking other road projects outside the study area as per the Roads Capital Budget. As noted in the Section 6.1.1, these projects can influence the timing of project construction in the SMA.

There are three proposed road projects adjacent to the study area worth noting:

- Construction of the Red Hill Creek Expressway;
- Reconstruction of Garner Road in Ancaster to 4 lanes as part of the Meadowlands development; and
- Extension of Trinity Church Road to Stone Church Road in Stoney Creek.

These projects are discussed in the following sections.

6.1.2.1 Red Hill Creek Expressway

This project has received Provincial EA approval but is currently undergoing an EA Review by the Federal government under the Canadian Environmental Assessment Act. The Municipality intends to begin construction of the Expressway once issues with the Federal government are resolved.

The Recommended Plan has been developed assuming the Expressway will be open to traffic by 2006. The travel demand forecasts carried out for this study support the identified need for additional road capacity across the escarpment, however, if it is not constructed it will not significantly affect the implementation of the Plan (see Section 6.3).

6.1.2.2 The Meadowlands (Neighbourhood 3, 4, and 5) Class Environmental Assessment Master Plan

This Master Plan has recently received approval. To facilitate the development, the Plan includes the widening of Garner Road from west of Southcote Road to Glancaster Road to four lanes plus turning lanes. This widening is to occur at the time of development and may influence the timing of the Rymal Road – Glancaster Road to West 5th Street widening project. The need for the project should be reviewed as development proceeds. The Garner Road section will require the same additional EA approvals prior to construction as Rymal Road (see Section 6.2).

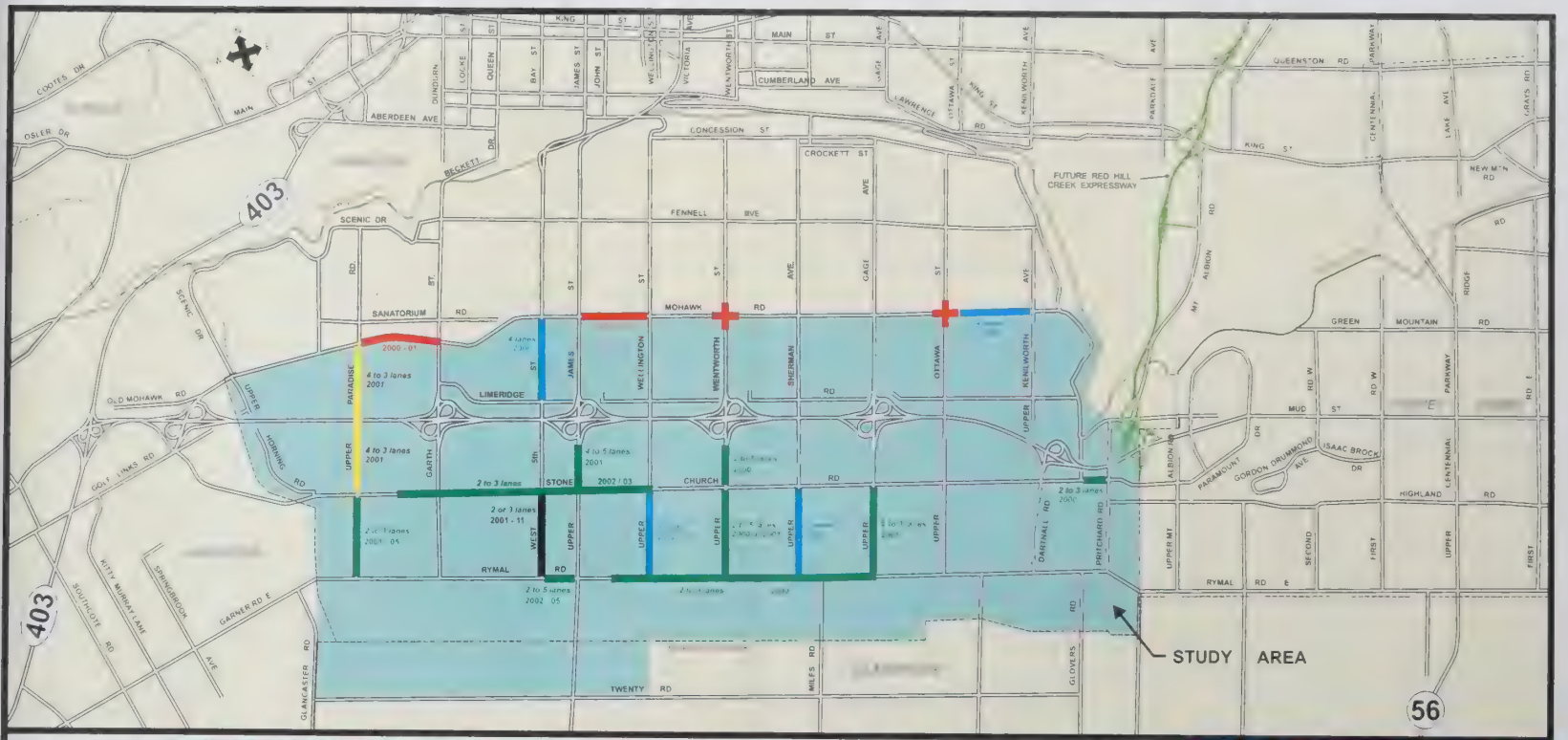
6.1.2.3 Trinity Church Road Extension

Stoney Creek is planning to extend Trinity Church Road from Rymal Road to Stone Church Road as part of the Heritage Green area development. This road would then connect to the Mud Street Interchange with the Red Hill Creek Expressway. The project will require necessary EA approvals before it can proceed.

6.2 Status of Projects under Class EA

The Class EA includes a framework to assist proponents in understanding the status of various projects. Projects are categorized into Schedules A, B, and C with reference to their magnitude of environmental impact; Schedule 'A' projects having the least impact and Schedule 'C' projects having the most impact.

As per the Class EA, projects identified as Schedule 'A' are automatically approved. All interim road resurfacing projects and reconstruction projects to the existing number of lanes are Schedule 'A' projects. This Master Plan satisfies the first two phases of the five phase Class EA process, i.e., the problem/opportunity identification and alternative solutions of this Master Plan.



SOUTH MOUNTAIN AREA TRANSPORTATION MASTER PLAN STUDY

Exhibit 6.1

- Widening and/or Reconstruction Projects
- Resurface
- Pavement Reallocation (Re-striping) Project
- Need for Improvement Dependent on Timing of Development of Connell Park
- Address Existing Safety Problems - to be Assessed Further

RECOMMENDED PLAN (Short-term Improvements) 2000 - 2005

SOUTH MOUNTAIN AREA TRANSPORTATION MASTER PLAN STUDY

Exhibit 6.2

- Short-Term Widening / Reconstruction Projects (2000 - 05)
- Long-Term Widening / Reconstruction Projects (2005 - 21)
- Long-Term Resurfacing/Reconstruction Projects, No Widening (2005 - 21)
- Pavement Reallocation (Restriping) Project

RECOMMENDED PLAN (Ultimate Configuration) 2021

All Schedule 'B' projects will be approved for construction following the 30-day public review (assuming there are no issues that can't be resolved). Schedule 'C' projects need to fulfill the additional requirements of Phases 3, 4, and 5 and will require consideration of site specific issues that are beyond the scope of this study. Table 6.1 identifies Class EA Schedule 'B' and 'C' designated projects.

The proposed reconstruction of Upper Wentworth Street has been scheduled for construction in 2000 and 2001. As a Schedule 'C' project, it requires additional planning as per the Class EA process. To expedite the additional EA requirements, Phases 3, 4, and 5 have been completed for this project and are documented in Chapter 7 of this report.

Table 6.1 Schedule 'B' and 'C' Designated Projects

Road	Section	# Lanes		Class EA Schedule
		Existing	*Future*	
North-South Roads				
Upper Paradise	Mohawk to Stone Church	4	3	B
	Stone Church to Rymal	2	3	B
Garth Street	Stone Church to Rymal	2	2 or 3	B
West 5th	Linc to Rymal	2	2 or 3	B
Upper James	Linc to Stone Church	4	5	B
Upper Wellington	Linc to Stone Church	2	4 or 5	C (completion of Phases 3-5 req'd)
	Stone Church to Rymal	2	3	B
Upper Wentworth	Linc to Rymal	2	5	C (completion of Phases 3-5 req'd)
Upper Sherman	Linc to Rymal	2	3	B
Upper Gage	Mohawk to Thorley/Edwina	4	5	B
	Stone Church to Rymal	2	3	B
East-West Roads				
Mohawk Road	U. James to Upper Wellington	4	5	B
Stone Church	Garth to Upper Wellington	2	3	B
	Arbour to Pritchard	2	3	B
Rymal	Glancaster to West 5th	2	5	C (completion of Phases 3-5 req'd)
	West 5th to Upper James	3	5	B
	Springside to Upper Gage	2	3	B

Note:

All interim road resurfacing projects and reconstruction projects to the existing number of lanes are Schedule 'A' projects and are approved without consideration of the Class EA process.

6.3 Master Plan Review Process

The South Mountain Area Transportation Master Plan is intended to guide transportation development over the next twenty (20) years. Although the data used to develop the Master Plan were the mos current and accurate available, they are subject to revision as circumstances on the South Mountai change.

For this reason, the Municipality will review projects within the Master Plan every five (5) years to determine whether there is a need to update and / or revise the Plan in response to changing circumstances. This need for a review is especially important considering potential for change resulting from the amalgamation of Hamilton and the surrounding municipalities at the end of this year (2000). Also important is the need to revisit the Plan if the construction of the Red Hill Creek Expressway is delayed significantly (i.e. beyond 2006).

This Master Plan update may entail changes to individual components of the Plan and/or revision to the implementation of those components. Because it is a system-wide plan, the projects that make up the Plan are interdependent and cannot be changed without considering the effects on the whole system.

7.0 Reconstruction and Widening of Upper Wentworth Street - Linc to Rymal Road Schedule 'C' Class Environmental Assessment

7.1 Introduction

The Recommended Transportation Master Plan identified the reconstruction and widening of Upper Wentworth Street - Linc to Rymal Road from two to four or five lanes (see Section 6.1). The implementation plan specified completion in two stages: Linc to Stone Church Road in 2000 and Stone Church Road to Rymal Road in 2001. Council has expressed their desire to have the entire project completed in 2000.

The need and justification for the project was established in Chapter 5 through a detailed travel demand and road condition analysis. Based on a detailed review of alternative solutions, Upper Wentworth Street was identified as one of the preferred roadways for widening that would address the need for additional lane capacity between Stone Church Road and the Linc.

7.1.1 Class EA Requirements

This project was identified as Schedule 'C' (see Section 6.2) as per the Class EA for Municipal Road Projects, Municipal Engineers Association (1993). Since the Master Plan covers the approval of the first two phases of the five phase Class EA process only, the project needs to fulfill the additional requirements of Phases 3, 4, and 5 (see following sections). This includes consideration of site-specific issues (e.g. noise impacts) not covered in the Master Plan.

The Master Plan (Chapters 1-6) documents the study approach, organization and consultation and the need and justification for the project. This Chapter includes detailed discussion of the project in terms of existing conditions along the corridor, the consultation program, the design alternatives considered, evaluation and rationale for the selected design, and a description of the recommended plan, potential impacts, mitigation measures, and construction requirements.

7.1.1.1 Class EA Phase 3 – Design Alternatives

The focus of Phase 3 is to develop the preferred design alternative. Alternatives are evaluated and compared, additional data may be collected and the best alternative is selected. This process is subject to consultation as described in Section 2.2.

The process of comparing design alternatives sometimes requires trade-offs. In all cases, the objective is to select an alternative that minimizes impacts to the environment and meets the transportation objectives.

7.1.1.2 Class EA Phase 4 – Environmental Study Report (ESR)

In this Phase, the decision-making process, the selected plan and the associated impacts are documented in an ESR, which is subject to public review. The ESR serves as the plan for the construction of the road as defined by the Study.

7.1.1.3 Class EA Phase 5 – Implementation

In this phase all the environmental approvals are in place and the Municipality can proceed to construction. Commitments made in the ESR are legally binding on the Municipality, therefore special design considerations, notices, monitoring etc. must be undertaken as documented in the ESR.

7.1.2 Objectives

The objectives of this detailed investigation is to:

- complete a detailed inventory of existing conditions;
- consider and compare different design alternatives;
- ensure that the public has an opportunity to be involved before decisions are made; and
- provide clear and complete documentation of the decision-making process that was taken to select the recommended plan for Upper Wentworth Street.

7.1.3 Project Limits

The project limits are bounded by the Linc to the north and Rymal Road to the south and adjacent land uses to the east and west of the right-of-way. The project limits are shown in Exhibit 7.1.

7.2 Consultation

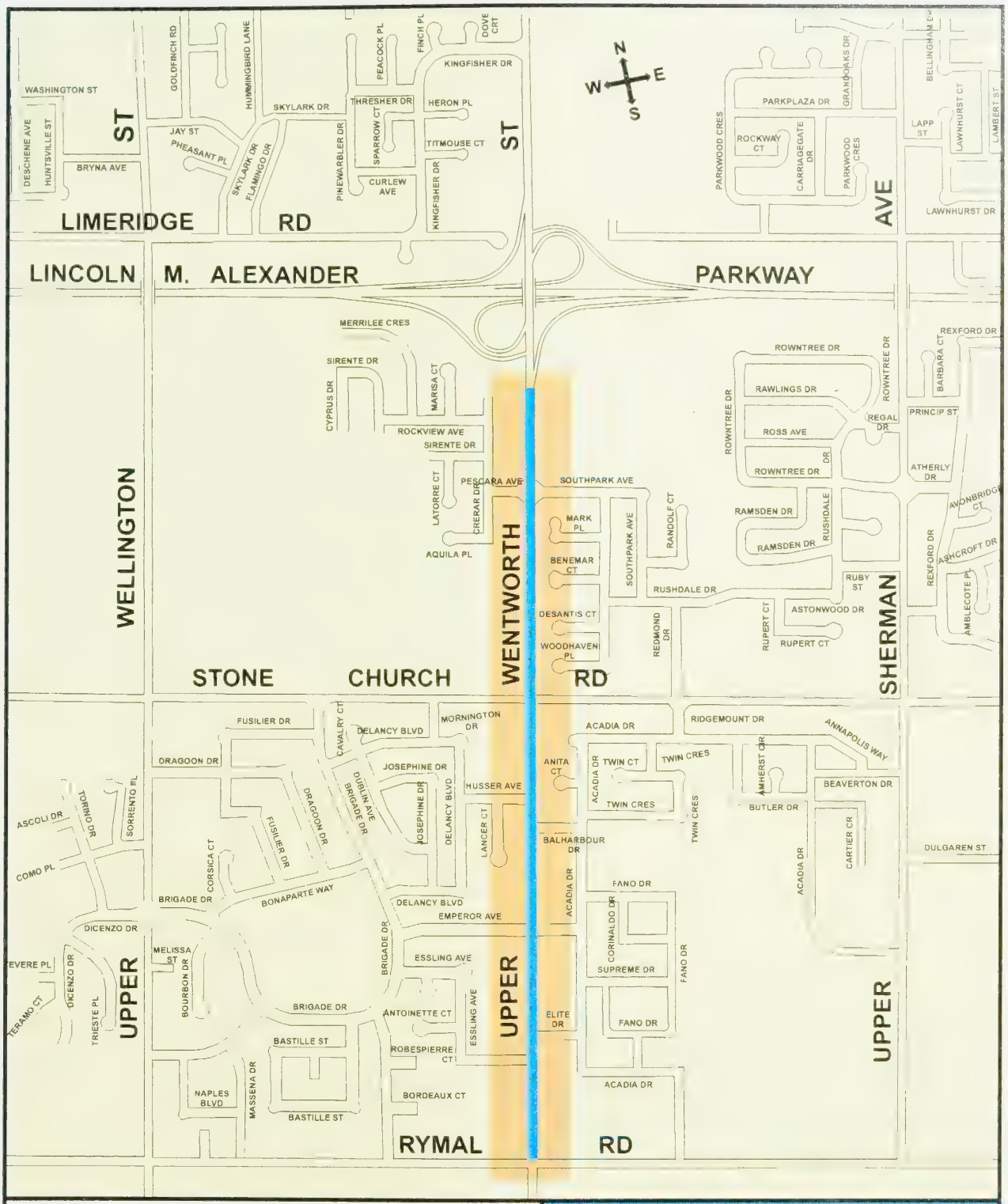
The approach and method to consultation was the same as for the Master Plan (see Section 2.3). Public involvement was facilitated with a public meeting held on March 1, 2000 at the Royal Canadian Legion. The purpose of the public meeting was to:

- review the existing/future transportation problems and opportunities in the study corridor;
- outline the planning process that was being followed and to present information on the need for the project;
- discuss design alternatives for the roadway in terms of their environmental impacts;
- give the public an opportunity to communicate their thoughts and ideas so that they could be reflected in the selected design

Participants at the public meeting were asked to fill out a questionnaire/comments sheet and identify any issues and concerns about the proposed reconstruction. The results of the questionnaire portion indicated that 21 of the respondents agreed with the proposal to widen Upper Wentworth Street.

Eight of the respondents indicated that there were issues with the proposal that would need to be resolved. These issues focused around the need for landscaping, pedestrian safety and access to a specific townhouse development. Other comments related to traffic noise, air quality, bus stops and bus shelters. Details of how these issues were addressed are documented in Section 7.6.3.

Details of the consultation plan and public involvement can be found in Appendix 'C'.



SOUTH MOUNTAIN AREA TRANSPORTATION MASTER PLAN STUDY

Exhibit 7.1

Project Limits

Study Area

PROJECT LIMITS

7.3 Existing Conditions

7.3.1 Environmental Features and Land Use, and Property

There are no significant natural environment features within the road right-of-way. However, a Zone of Archaeological Potential occurs south of the Linc.

South of the Linc, residential land use is predominant with a mix of single and attached housing units. The majority of this housing has reverse frontage (back yards face the road). A major open space, Thomas McQuesten Park, is located directly south of the Linc on the east side. A commercial plaza has been developed at the intersection of Upper Wentworth Street and Rymal Road.

As the area has developed/redeveloped, most lands for the right-of-way have been dedicated to the Municipality as part of Development/Subdivision Agreements. Therefore the full 36m right-of-way exists except for three small properties (one commercial; two residential) that have remained undeveloped in the vicinity of Stone Church Road.

7.3.2 Utilities and Municipal Infrastructure

The location and status of existing utilities and municipal services in the study area were obtained from field investigations, a review of Region construction contracts and through consultation with utility agencies. Exhibit 7.2 shows the location of all major utilities in the area.

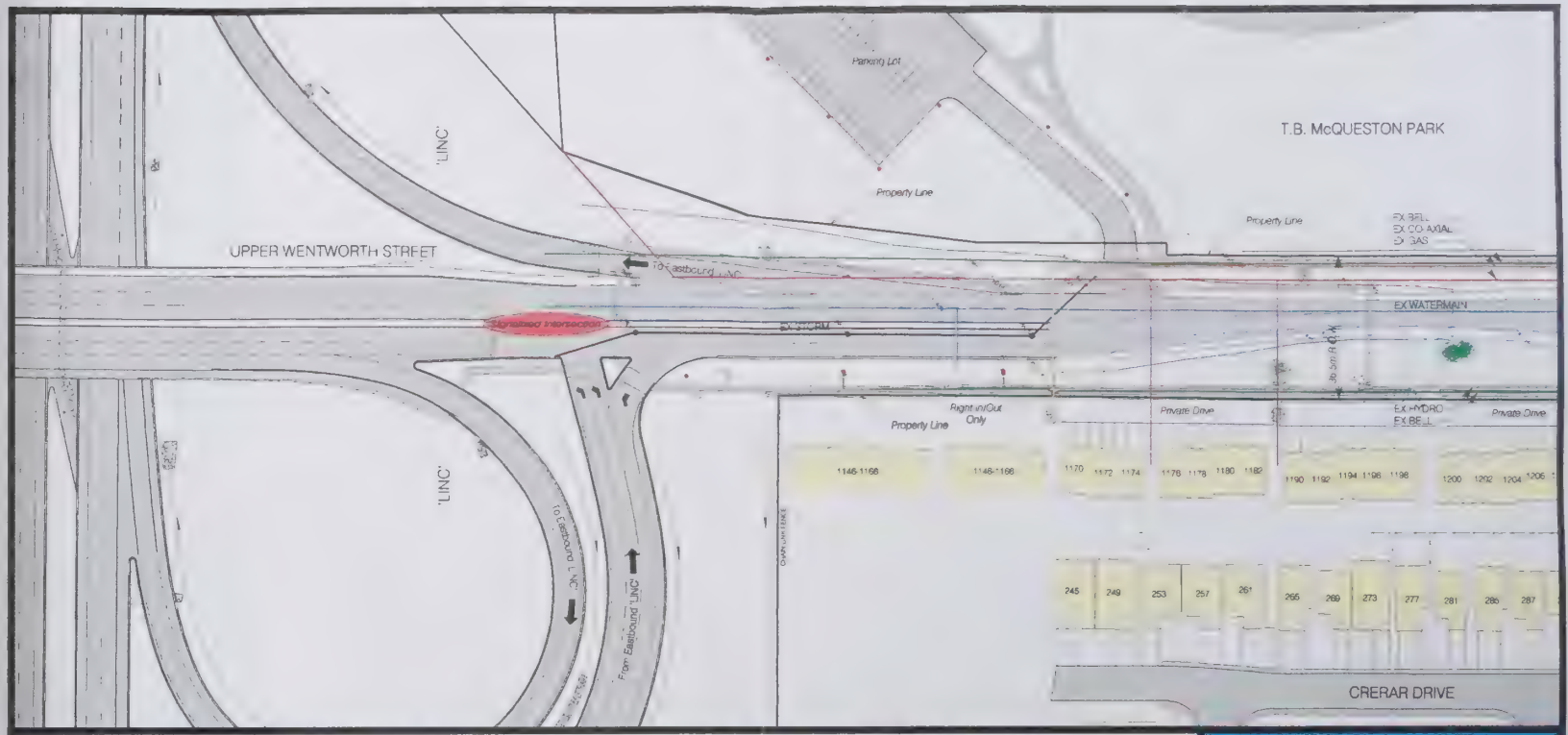
The following utilities are present within the existing right-of-way:

- Watermain
- Sanitary sewer
- Storm sewer
- Gas
- Cable TV
- Hydro
- Bell Telephone

The existing utilities are shown on Exhibit 7.2.

7.3.3 Storm Water

Although the right-of-way is rural (gravel shoulders with ditches), stormwater runoff flows into storm sewers parallel to the road via ditch inlets from Pescara Avenue/South Park Avenue to Rymal Road. A change to the road cross-section would not require an expansion of the drainage system except to extend the storm sewer north from Pescara Avenue/South Park Avenue to the Linc and possibly replace ditch inlets with catch basins if the cross section is urbanized (concrete curb and gutter).



SOUTH MOUNTAIN AREA TRANSPORTATION MASTER PLAN STUDY

Exhibit 7.2 (1 of 5)

N E S W

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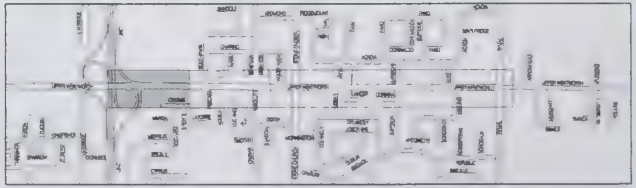

LEGEND

- existing storm sewer
- existing sanitary sewer
- existing watermain
- existing gasmain
- existing bell conduit
- existing hydro conduit
- existing co-axial cable

Upper Wentworth Street EXISTING CONDITIONS

SOUTH MOUNTAIN AREA TRANSPORTATION MASTER PLAN STUDY

Exhibit 7.2 (2 of 5)

N E S W

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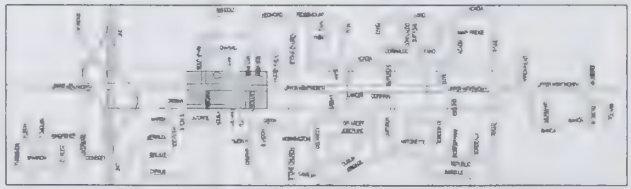
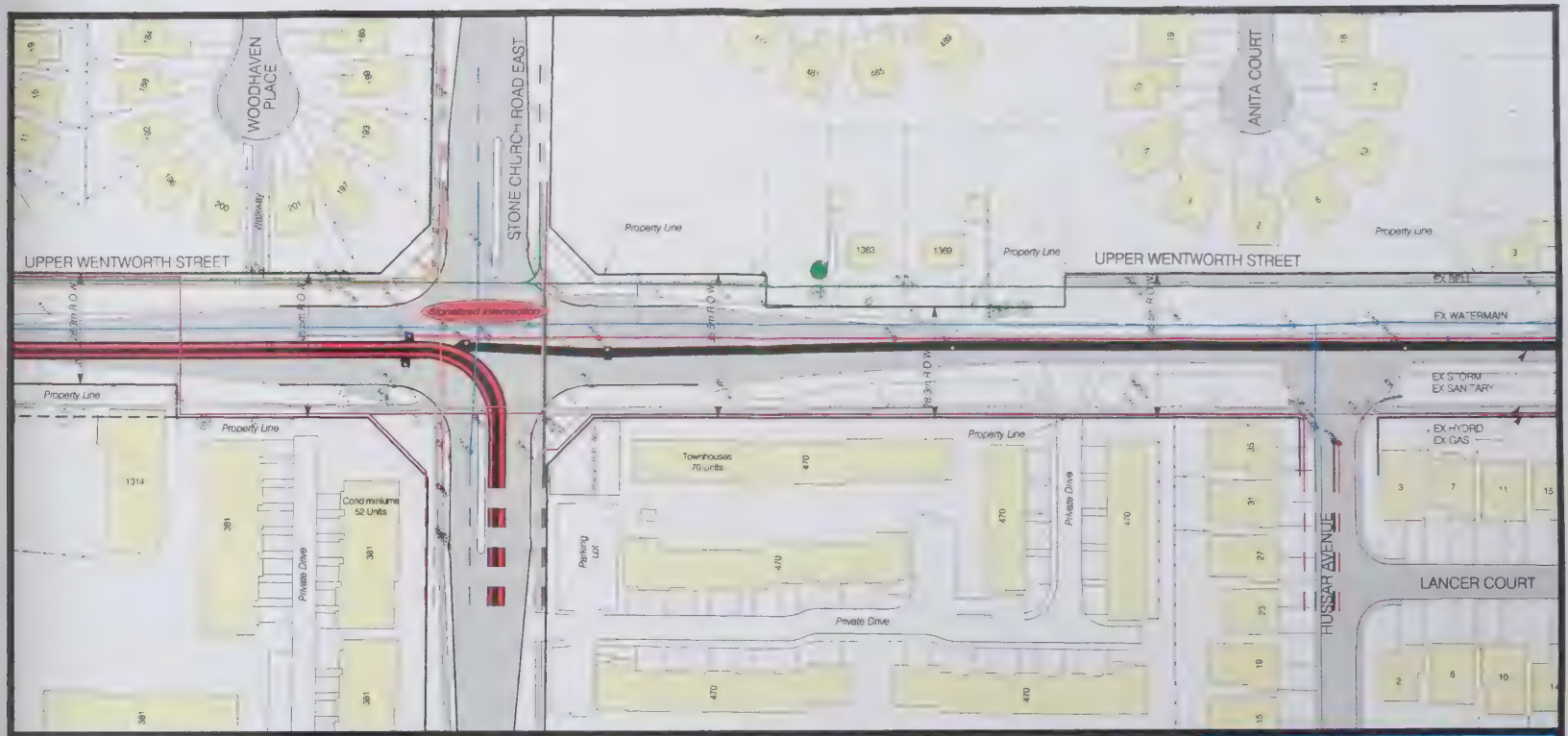


LEGEND

- existing storm sewer
- existing sanitary sewer
- existing watermain
- existing gasmain
- existing bell conduit
- existing hydro conduit
- existing co-axial cable

Upper Wentworth Street EXISTING CONDITIONS



SOUTH MOUNTAIN AREA TRANSPORTATION MASTER PLAN STUDY

Exhibit 7.2 (3 of 5)

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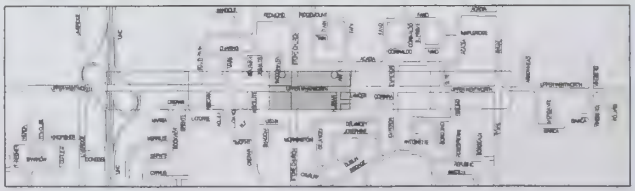
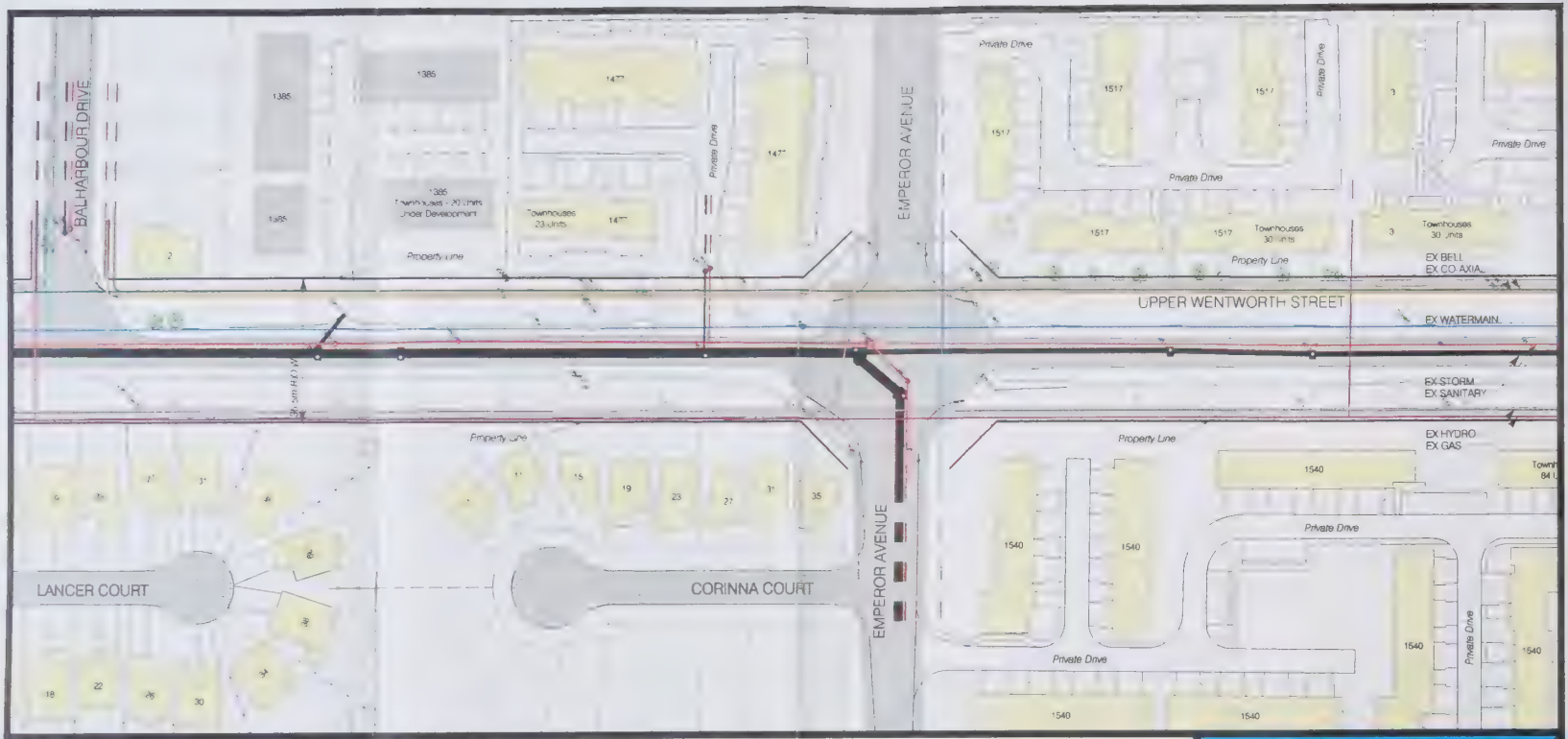


LEGEND

- existing storm sewer
- existing sanitary sewer
- existing watermain
- existing gasmain
- existing bell conduit
- existing hydro conduit
- existing co-axial cable

Upper Wentworth Street EXISTING CONDITIONS



SOUTH MOUNTAIN AREA TRANSPORTATION MASTER PLAN STUDY

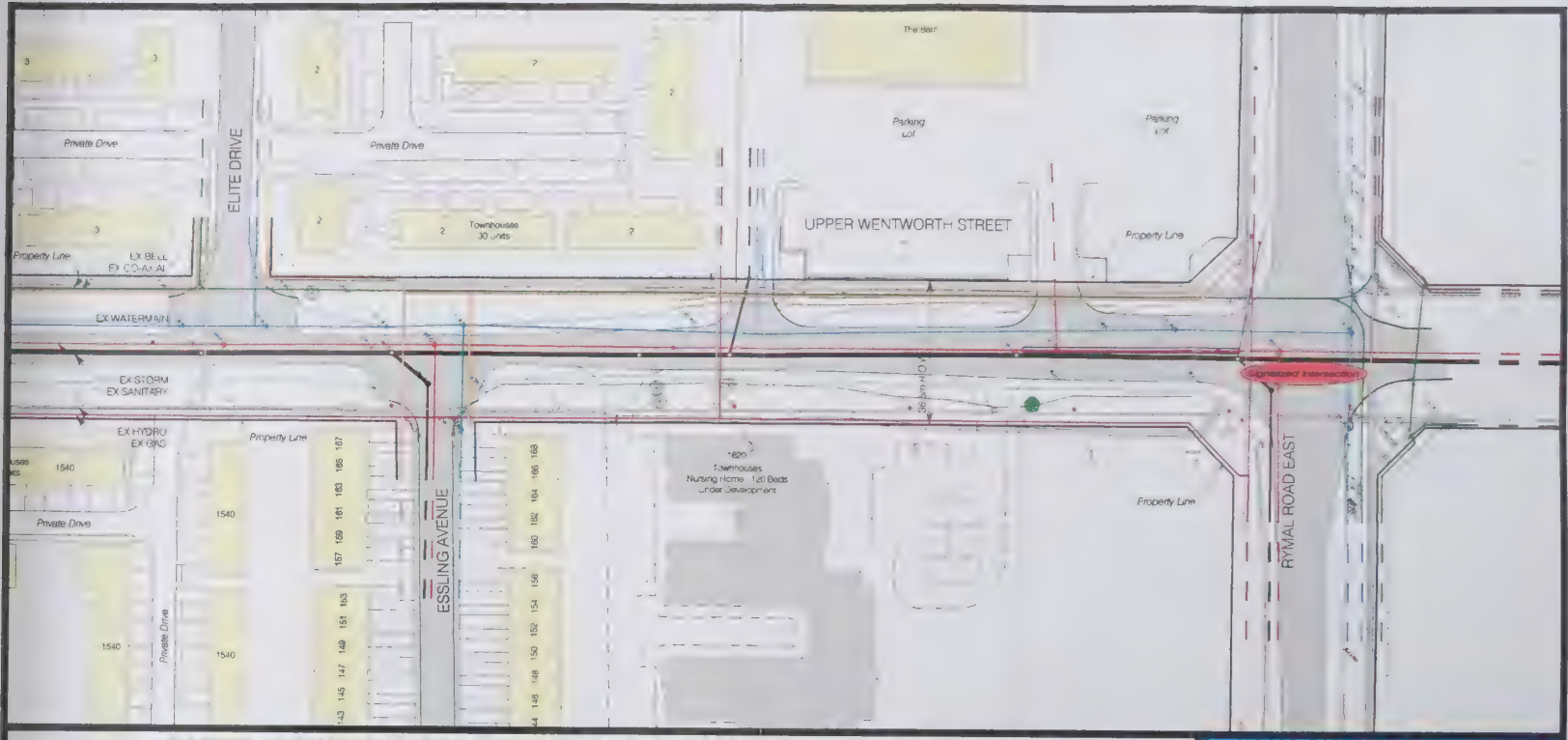
Exhibit 7.2 (4 of 5)

SCALE: 1:1,000

LEGEND

- existing storm sewer
- existing sanitary sewer
- existing watermain
- existing gasmain
- existing bell conduit
- existing hydro conduit
- existing co-axial cable

Upper Wentworth Street EXISTING CONDITIONS

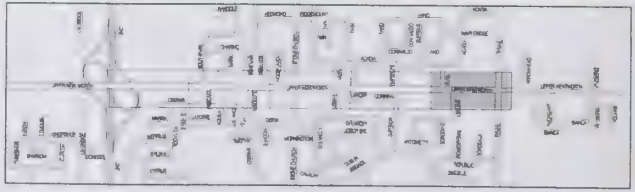


SOUTH MOUNTAIN AREA TRANSPORTATION MASTER PLAN STUDY

Exhibit 7.2 (5 of 5)

N E S W

SCALE: 1:1,000



LEGEND

- existing storm sewer
- existing sanitary sewer
- existing watermain
- existing gasmain
- existing bell conduit
- existing hydro conduit
- existing co-axial cable

Upper Wentworth Street EXISTING CONDITIONS

7.3.4 Transportation Facilities and Traffic Operations

7.3.4.1 Existing Conditions (refer to Exhibit 7.2)

Upper Wentworth Street is a two-lane arterial road with gravel shoulders and a designated 36m right-of-way. Limited direct access to adjacent development is consistent with its primary function to move local and through traffic.

The road interchanges with the Linc. As part of the interchange construction for the Linc, Upper Wentworth Street was reconstructed to approximately 100m south of the freeway centreline. Upper Wentworth Street is a designated truck route and has a statutory speed limit of 50km/h.

There are left-turn lanes at all signalized intersections, i.e. Pescara Avenue/South Park Avenue, Stone Church Road, and Rymal Road. There are six non-signalized intersections into adjacent residential developments where left-turn lanes are not provided; the intersection at Emperor Avenue is a four-way intersection, the others are three-way intersections.

The road has been identified as having operational deficiencies related to road condition and capacity (see Section 4.3).

7.3.4.2 Traffic Volumes

Since the opening of the Linc, traffic patterns have changed significantly resulting in a 20-25% increase in traffic volumes on Upper Wentworth Street between the Linc and Emperor Avenue. Traffic from Emperor Avenue to Rymal Road has remained stable. Future traffic volumes (Year 2021) were forecast using the Regional Travel Demand Model (refer to Section 3.4 and Appendix 'A' for details). Existing and future traffic volumes are shown in Table 7.1.

Table 7.1 Existing and Future Traffic Volumes

Section	Daily 2-Way Traffic Volumes (24 hr)	
	1998/99	2021
Linc to Pescara to Stone Church	12,700-14,950	26,000-30,000
Stone Church to Rymal	6,500-7,400	12,000-16,000

7.3.4.3 Pedestrian and Cyclist Facilities

Sidewalks have been or will be constructed along most of the right-of-way as part of Subdivision Agreements (see Exhibit 7.2). There are no sidewalks adjacent to the three properties that have remained unchanged as the area around them has redeveloped. Sidewalks not constructed as part of Subdivision Agreements are normally contingent on local improvement funding by the City of Hamilton.

Upper Wentworth Street is not part of the bikeway network through the study area. Cyclists share the roadway with other vehicles.

7.3.4.4 Accident History

Collision data for the years 1994-1998 were reviewed and no specific concerns were noted.

7.4 Alternatives and Evaluation

7.4.1 Design Alternatives

The South Mountain Area Transportation Master Plan Study recommended that Upper Wentworth Street be widened to 4 or 5 lanes (4 lanes plus a centre turn lane) from Rymal Road to the Linc (see Section 5.4 and 5.6).

Two basic options were identified:

Option 1: 5 Lanes (4 lanes with a centre lane) with either:

- a Continuous 2-Way Centre Left-turn Lane; or
- a Raised Median with Left-turn Lanes at all access points

Option 2: 4 Lanes with Left-turn Lanes at Major Intersections

There was no advantage in shifting the proposed roadway off the existing road centreline as it would unfairly impact residences on one side of the right-of-way. Therefore, horizontal shifts in the alignment were only considered adjacent to T. B. McQueston Park where it was necessary to provide for a left turn lane.

For both options an urban cross-section (curb and gutter) was selected over a rural cross-section (gravel shoulders and grassed ditches) because of lower maintenance costs, improved air quality (dust from gravel shoulders eliminated), and improved aesthetics.

Since the study area is generally flat, the location of existing services (watermains, sewers, etc.), and the need to maintain existing driveways and sideroad entrances limit the opportunity to consider different vertical alignments. A profile grade will be selected that best accommodates all of the noted concerns in the detail design phase of the project.

The basic widening to 4 or 5 lanes is a satisfactory solution from purely a traffic operations perspective. The only two issues considered by the Study Team in the evaluation between the two options are:

- pedestrian safety; and
- aesthetics.

Option 1 could accommodate a Raised Median which would serve as:

- a refuge for pedestrians crossing the street; and
- an area for landscaping that would improve the look of the roadway.

7.4.2 Evaluation and Selection of the Recommended Plan

The evaluation of design alternatives considered the effects on the natural environment, social, economic and cultural environment, and transportation engineering data. The evaluation criteria used for the evaluation represent issues of importance to the safe and efficient operation of the roadway and were developed by the Study Team. The evaluation criteria are listed below.

i) Natural Environment

- Vegetation
- Air Quality

ii) Socio-Economic Environment

- Aesthetics
- Property required
- Number of Residences Adjacent to Right-of-Way
- Number of Recreational Facilities Affected
- Changes in Existing Noise Levels

iii) Transportation

- Level of Service
- Pedestrian safety
- Bicycle safety
- Access
- Collision Reduction Potential (CRP)

7.4.3 Evaluation of Design Options

Both alternatives satisfy the project objectives in terms of facilitating traffic. However, the Five Lanes with a Raised Median was preferred overall because:

- It offers additional vehicle capacity and collision reduction potential at a minor increase in cost.
- It would provide better vehicle access to the residential areas.
- The potential conflict between opposing left-turning vehicles would be reduced.
- Pedestrian refuge areas at key crossing locations along the median can be incorporated into the design improving pedestrian safety.
- Streetscaping can be incorporated into the design of the median to enhance the look of the road.

The evaluation is summarized in Table 7.2.

Therefore a 5-Lane Upper Wentworth Street with a Raised Median is the Preferred Option.

Table 7.2 Evaluation of Design Alternatives

Factor / Indicator	OPTION 1 5 Lanes (4 lanes with a centre lane)		OPTION 2 4 Lanes with Left-Turn Lanes at Major Intersections
	Continuous 2 -Way Centre Left -Turn Lane	*Raised Median (with Left -Turn Lanes at all aCCess points)*	
Natural Environment			
Vegetation Removal (Trees removed)	Approximately 6 trees removed; to replaced as per Municipal policy. Potential to landscape the right-of-way		
Air Quality	The quality of air is not expected to degrade and has the potential to improve with the elimination of gravel shoulders (reduced dust levels) and improved traffic flow (reduced emissions generated as a result of less vehicle stopping-and-starting).		
Social Environment			
Aesthetics	Potential to landscape the boulevard area.	Potential to landscape the boulevard area and the median.	Potential to landscape the boulevard area.
Property required	None, unless sidewalks are constructed as a local improvement in the area of 1363 and 1369 Upper Wentworth Street south of Stone Church and 1314 Upper Wentworth Street north of Stone Church, west side.		
Number of Residences Adjacent to Right-of-Way	Approximately 155 residences back onto the right-of way, including single-family, townhouse, and apartment dwellings		
Number of Recreational Facilities Affected	1; T.B. McQueston Park		
Changes in Existing Noise Levels---	Not significant; increases of 1-2 dB in the short term and up to 4 dB in the long term.		
Transportation			
Level of Service	Improvement will result in good LOS over the long-term	Improvement will result in good LOS over the long-term. Raised median will marginally reduce the lane capacity compared to the continuous lane option.	Improvement will result in good LOS over the long-term. Lane capacity will be marginally less than the continuous lane option.
Pedestrian Safety	Widening results in increased risk to pedestrians crossing the road; especially at mid-block locations.	Widening results in increased risk to pedestrians crossing the road; however, the raised median provides a refuge area.	Widening results in increased risk to pedestrians crossing the road; especially at mid-block locations.
Bicycle Safety	Widening results in increased risk to cyclists crossing the road. However, for cyclists travelling along the road, reduced vehicle densities could result in a reduction of conflict with other vehicles	Widening results in increased risk to cyclists crossing the road. However, the raised median provides a refuge area. For cyclists travelling along the road, reduced vehicle densities could result in a reduction of conflict with other vehicles.	Widening results in increased risk to cyclists crossing the road. For cyclists travelling along the road, reduced vehicle densities could result in a reduction of conflict with other vehicles.
Access	Access is improved to all private driveways and minor road entrances (except at 1146-66 Upper Wentworth).		Not predicted to change.
Collision Reduction Potential (CRP)	CRP is predicted to increase with the addition of continuous left-turn lane; however there is a potential conflict between opposing left-turning vehicles.	CRP is predicted to increase with the addition of left-turn lanes.	Not predicted to change.

7.4.4 Public Input and Council Direction

Input received from the public at the public meeting on March 1, 2000 was favourable to the widening project. As noted, the predominant issues of concern were focused on:

- pedestrian safety in the vicinity of Emperor Avenue
- the streetscape and need for landscaping
- vehicle access to a townhouse development (1146-1166 Upper Wentworth Street)

These issues and others and how they will be addressed are described in more detail in Section 7.6.4.

The Ministry of Citizenship, Culture and Recreation indicated, by letter on March 7, 2000. the need to undertake an archaeological survey within the right-of-way as this area was identified as a Zone of Archaeological Potential (see Exhibit 3.2). The Municipality has retained a consultant to carry out this work on May 3, 2000.

Following the public meeting the preferred option and the timing for construction was approved by the Transportation Services Committee (TSC) on March 27, 2000 and subsequently adopted by Regional Council on April 4, 2000 (see Appendix 'B'). It should be noted that on April 4, 2000, Regional Council indicated its desire to complete the entire reconstruction of the Upper Wentworth Street project in 2000.

7.5 The Recommended Plan for Upper Wentworth Street

7.5.1 Design Criteria

As a major arterial roadway the following design criteria were incorporated into the Plan:

Design Speed		70 km/hr
Posted Speed		50 km/hr
Crest Vertical Curve		K=25
Sag Vertical Curve		K=12
Lane Width	- through lane	3.5m
	- turning lane	3.5m (5m at intersections with median islands)
Boulevard		
Sidewalks		1.5m

7.5.2 Features of the Selected Plan for Upper Wentworth Street

The reconstruction and widening of Upper Wentworth Street from Rymal Road to the Linc is the preferred plan (refer to the following Design Plates). Features of the Plan include the following:

- The existing two-lane road with gravel shoulders will be reconstructed to five lanes (two lanes in each direction with a centre-turn lane) with concrete curb and gutter.
- The 3.5m centre-turn lane will incorporate a raised median that will provide a refuge for pedestrians and can be landscaped. Two specific median locations (at Hussar Avenue and at Elite Drive) may be incorporated and will include wheelchair accessible areas including median curb cuts.

- The proposed alignment follows the existing centreline south of Stone Church Road. The proposed centreline will be shifted approximately 5m to the west north of Pescara Avenue South Park Avenue to provide a left-turn lane into T B McQueston Park. The alignment gradually ties into the existing centreline at Stone Church Road.
- The sidewalk will be completed in areas that are subject to existing Subdivision Agreements The remaining locations are subject to local improvements.
- Landscaping will be incorporated into the right-of-way as per Regional policies. The landscaping plan will be developed as part of the detail design phase and could include median landscaping.
- Concrete medians will be includes at all signalized intersections to accommodate traffic signal heads
- Construction of a storm sewer from the Pescara Avenue/South Park Avenue to the Linc to facilitate drainage from the right-of-way.
- Bus stop locations will be finalized during the detail design phase.
- No additional property is required. All existing accesses will be maintained and future approved entrances will be accommodated.
- Changes to utilities required for the widening will be resolved during the detail design phase

7.5.3 Project Staging

Subject to EA approval it is intended to reconstruct the road in two stages (see Section 5 8).

Section	Year
• Linc to Stone Church Road	2000
• Stone Church Road	2001

As noted above. Council has indicated their desire to complete the entire project in 2000. The ability of completing the south section is dependent on funding availability and the practicality of finishing the project before the arrival of winter. This will be investigated as part of the detail design phase.

7.5.4 Issues and Mitigating Measures

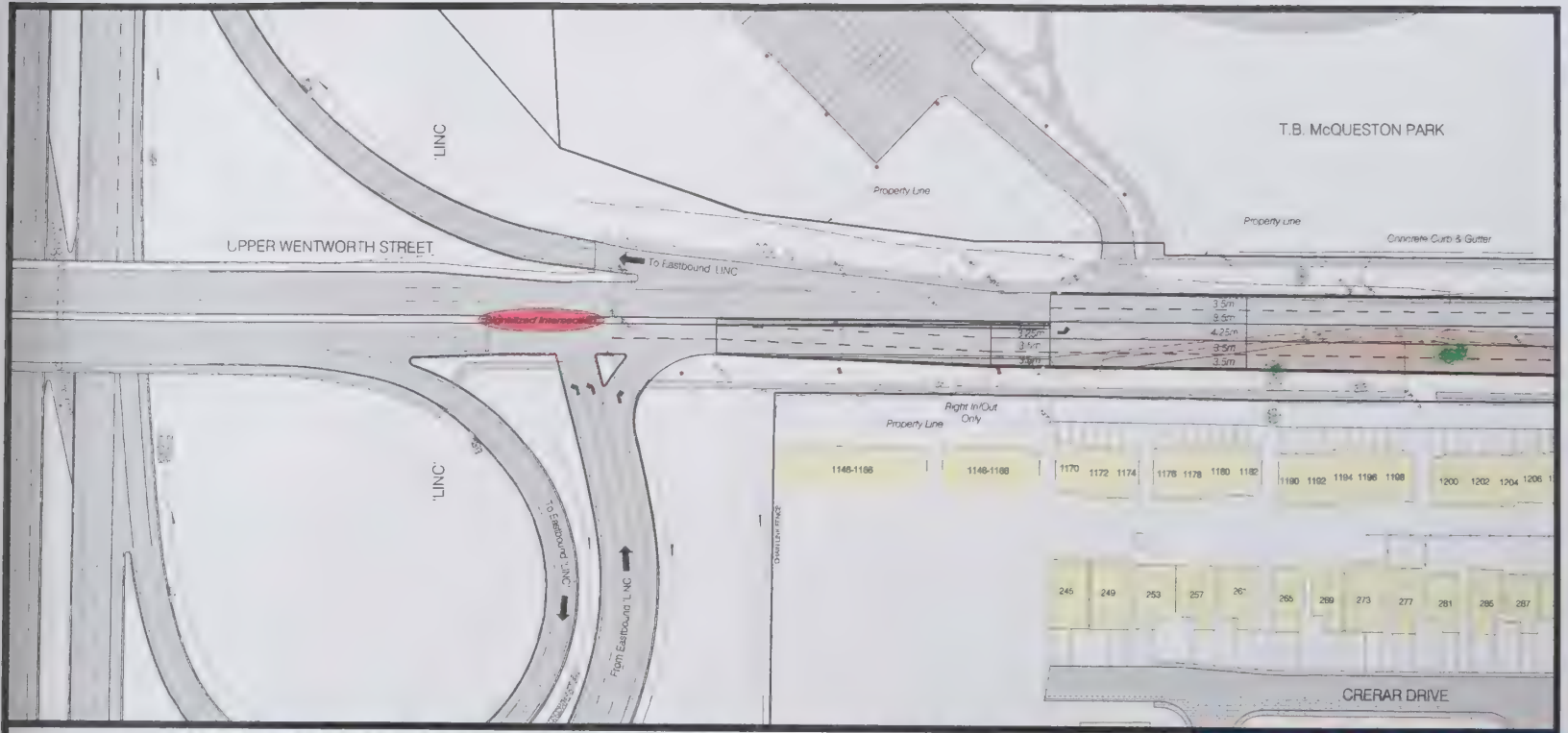
A commitment to incorporating measures to mitigate potential environmental impacts and reduce them to an acceptable level is proposed by the Municipality. The specific details of any required mitigation will be developed in the detail design phase. The following provides a description of issues and proposed mitigation, if any, to be implemented.

7.5.4.1 Pedestrian Safety

The design of the road incorporates pedestrian crossing facilities: however. residents in the vicinity of Emperor Avenue are concerned with pedestrian safety. particularly school children crossing the road Based on existing and projected traffic and pedestrian volumes. traffic signals or pedestrian priority signals are not warranted.

Mitigating Measure:

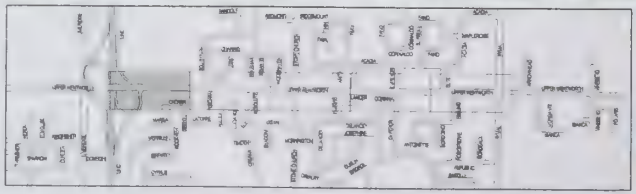
Currently. the Municipality employs a crossing guard to facilitate school children across the road at Emperor Avenue. This is an effective and inexpensive way of ensuring pedestrian safety during peak periods and its use will be continued following the reconstruction.



SOUTH MOUNTAIN AREA TRANSPORTATION MASTER PLAN STUDY

Design Plans (1 of 5)

SCALE:
1:1,000

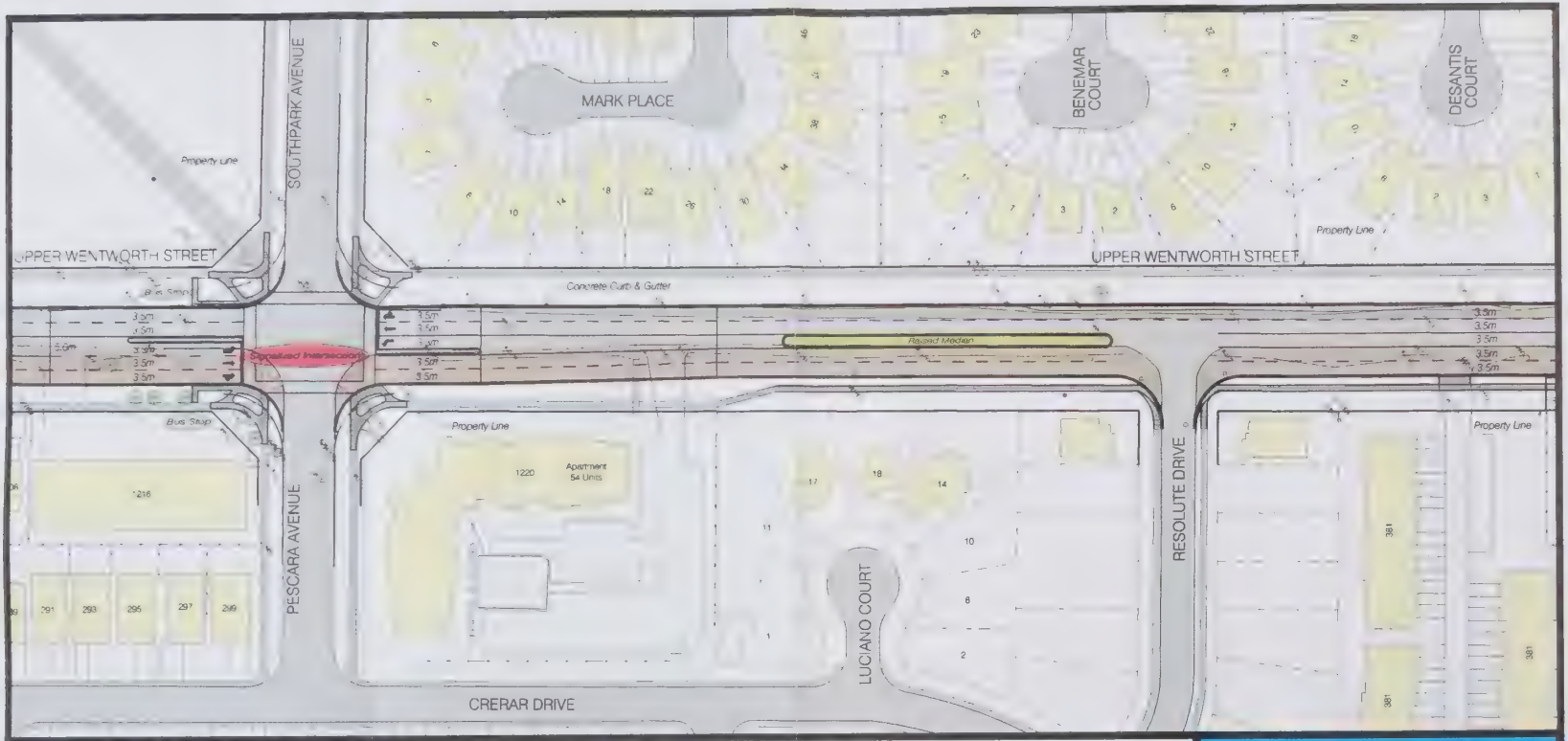


LEGEND

- future sidewalk
- existing pavement/sidewalk
- road widening
- raised median

NOTES:
1. Provision of sidewalks is subject to the Local Improvement Act and/or Subdivision Agreements
2. Treatment (landscaping, etc.) of raised medians is subject to review

Upper Wentworth Street
RECOMMENDED PLAN



SOUTH MOUNTAIN AREA TRANSPORTATION MASTER PLAN STUDY

Design Plates (2 of 5)

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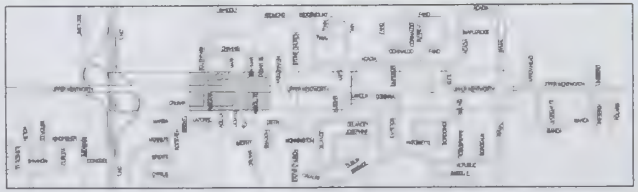


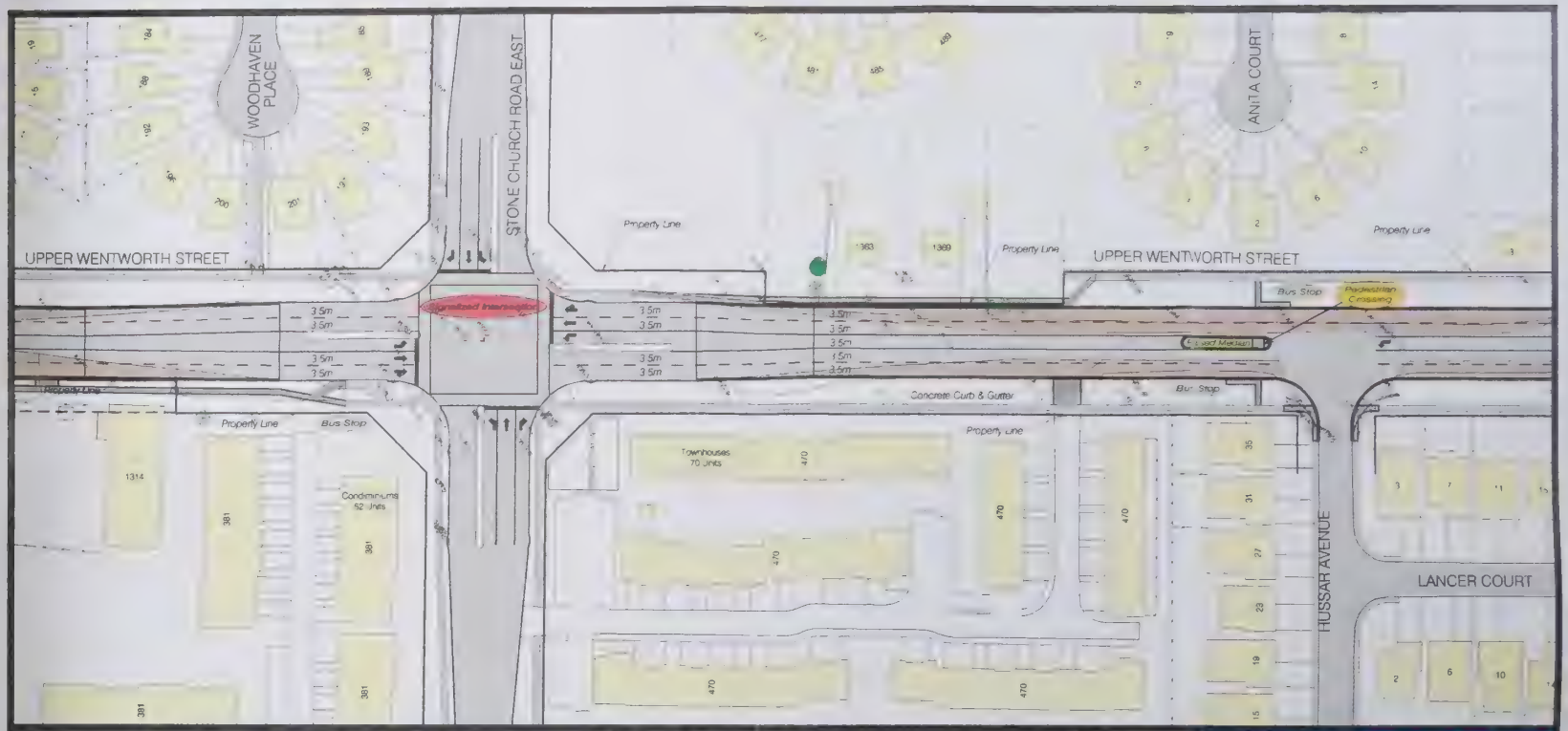
LEGEND

- future sidewalk
- existing pavement/sidewalk
- road widening
- raised median

NOTES:

1. Provision of sidewalks is subject to the Local Improvement Act and/or Subdivision Agreements
2. Treatment (landscaping, etc.) of raised medians is subject to review

Upper Wentworth Street
RECOMMENDED PLAN

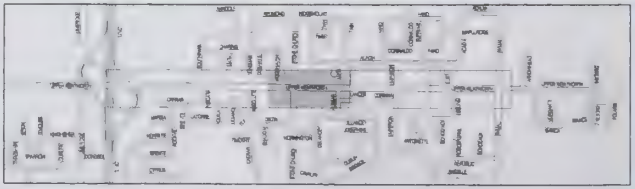


SOUTH MOUNTAIN AREA TRANSPORTATION MASTER PLAN STUDY

Design Plates (3 of 5)

N W E S

SCALE: 1:1,000



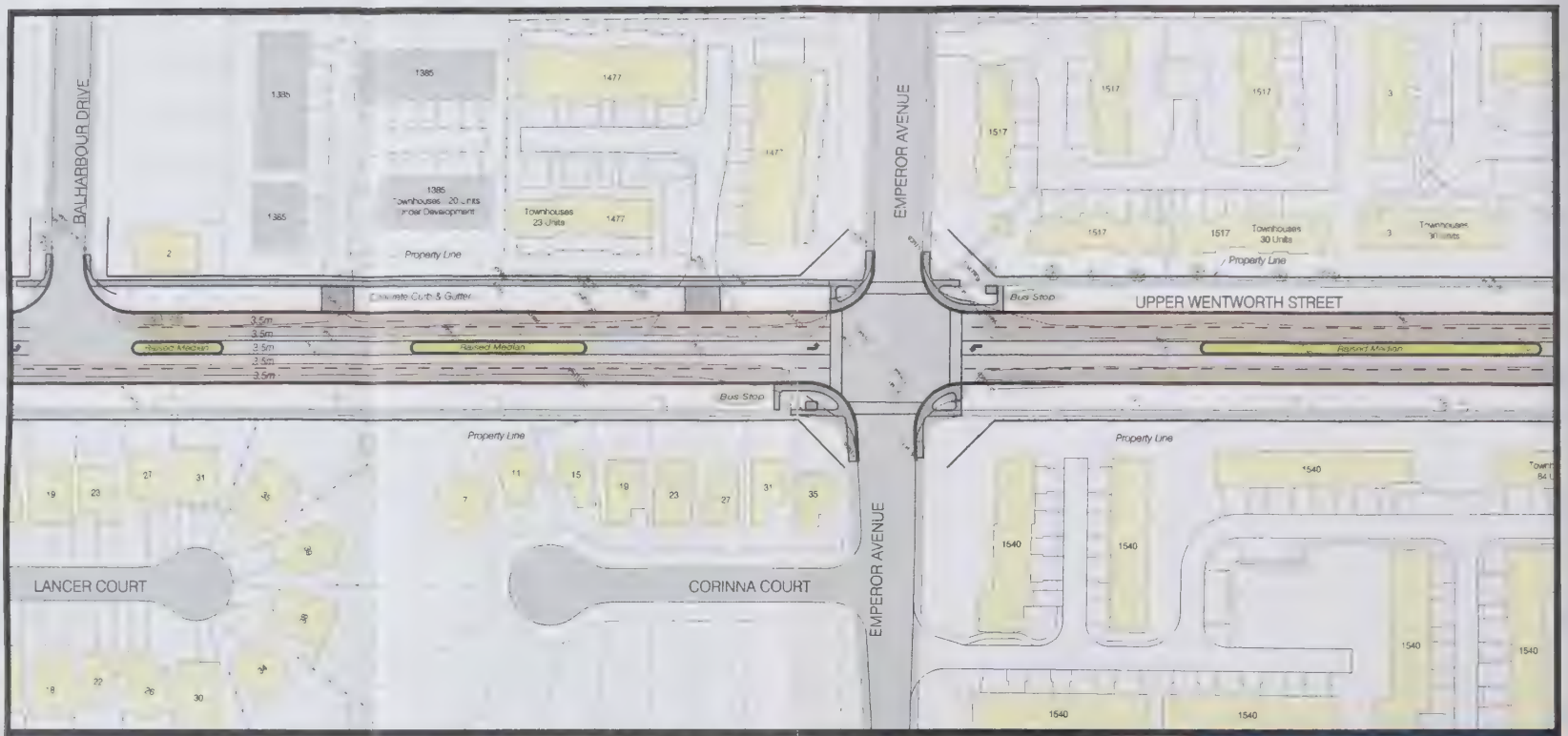
LEGEND

- future sidewalk
- existing pavement/sidewalk
- road widening
- raised median

NOTES

1. Provision of sidewalks is subject to the Local Improvement Act and/or Subdivision Agreements
2. Treatment (landscaping, etc.) of raised medians is subject to review

Upper Wentworth Street RECOMMENDED PLAN



SOUTH MOUNTAIN AREA TRANSPORTATION MASTER PLAN STUDY

Design Plates (4 of 5)

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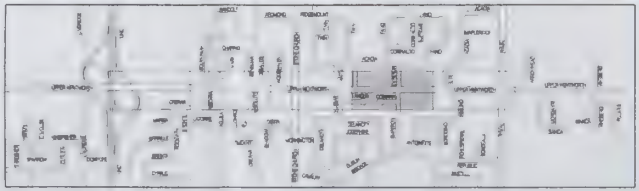
SCALE: 1:1,000

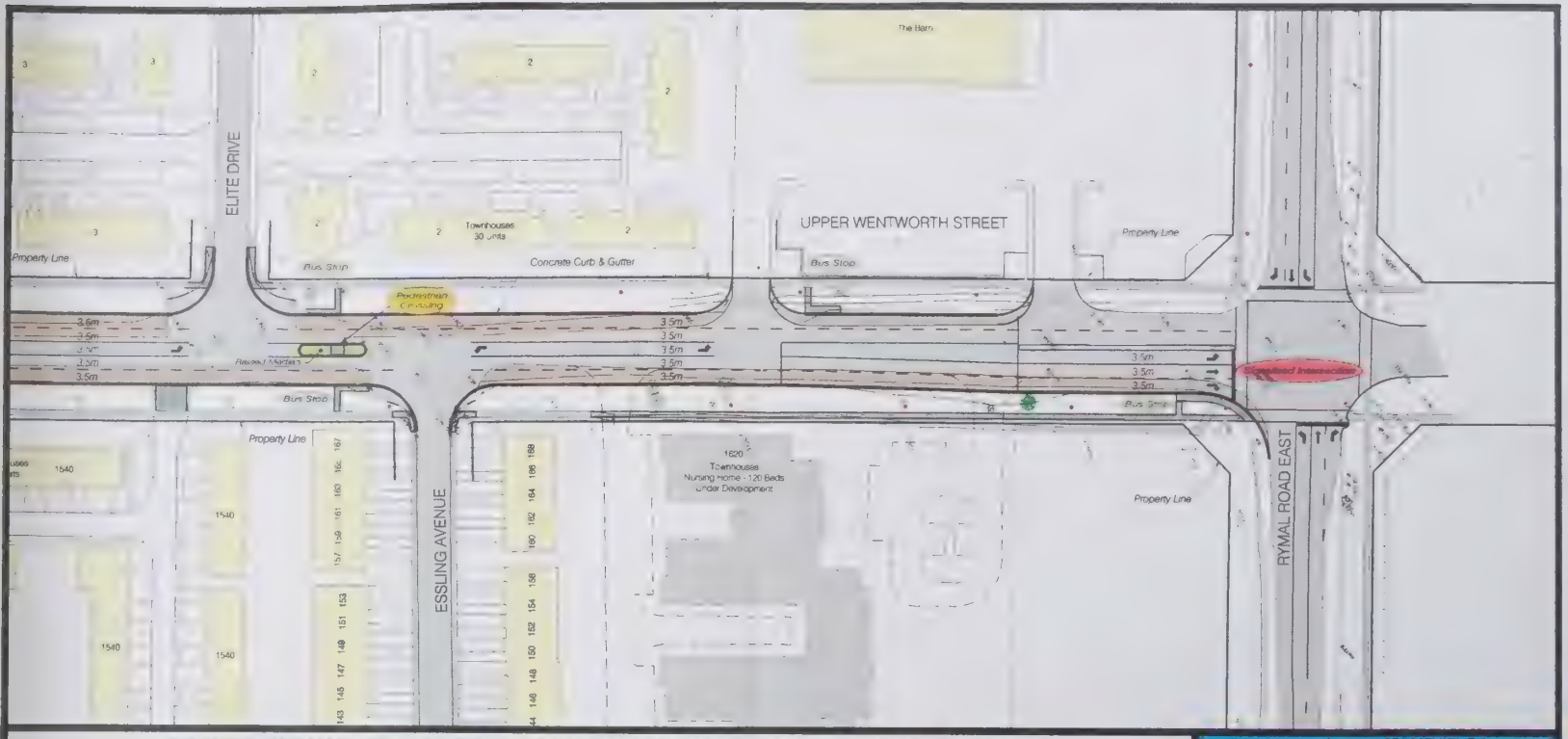


LEGEND

- future sidewalk
- existing pavement/sidewalk
- road widening
- raised median

NOTES:
1. Provision of sidewalks is subject to the Local Improvement Act and/or Subdivision Agreements
2. Treatment (landscaping, etc.) of raised medians is subject to review

Upper Wentworth Street RECOMMENDED PLAN



SOUTH MOUNTAIN AREA TRANSPORTATION MASTER PLAN STUDY

Design Plates (5 of 5)

N W E S

SCALE: 1:1,000

LEGEND

- future sidewalk
- existing pavement/sidewalk
- road widening
- raised median

NOTES:
1. Provision of sidewalks is subject to the Local Improvement Act and/or Subdivision Agreements
2. Treatment (landscaping, etc.) of raised medians is subject to review

Upper Wentworth Street RECOMMENDED PLAN

Although it is unlikely traffic volume and delay to traffic on Emperor Avenue will warrant installation of a traffic signal in the near future, the Municipality will periodically review the need for both a traffic signal and a pedestrian priority signal at this location.

7.5.4.2 Landscaping

Typically, landscaping is incorporated into most of the Municipality's road projects in an effort to improve roads visually. The streetscape was noted by the public as a concern, but so was the need to find a low cost solution.

Mitigating Measure:

As noted, landscaping will be incorporated into the right-of-way as per Regional policies. The landscaping plan will be developed as part of the detail design phase and could include median landscaping.

7.5.4.3 Access to 1146-66 Upper Wentworth Street

Four residents living at or near this townhouse development located at the southwest quadrant of the Linc requested the modification of an existing median island adjacent to their homes to allow full access off Upper Wentworth Street instead of the current right-in/right-out only access.

The existing raised median islands along Upper Wentworth Street in the vicinity of the Linc interchange were placed according to a policy approved by Regional Council on March 6, 1990 (TSC Report 2-90) that prevents full access within 110m of an expressway ramp terminal intersection because it would adversely affect the safety and traffic operations near the ramp terminals.

If that the entrance is within 85m of the Expressway ramps, the Municipality compromised the by-law at the time of and allowed the current access condition to facilitate the development.

Mitigating Measure:

None. As previous, the Municipality is not prepared to change the access condition as it would adversely affect the safety and traffic operations near the ramp terminals. The details of this issue are documented in Appendix 'D'.

7.5.4.4 Air Quality

Dust caused by buses driving on the gravel shoulders was a noted concern by residents as was the general quality of air caused by vehicle emissions.

Elimination of gravel shoulders will reduce dust levels. Vehicle emissions will be lower as a result of less vehicle stopping-and-starting.

Mitigating Measure:

Dust levels during construction will be controlled through the application of calcium chloride or water during construction as per standard specifications.

7.5.4.5 Land Use and Property

Land use adjacent to the corridor has been developed assuming Upper Wentworth as a major north-south transportation route. The right-of-way abuts the rear properties of residential development and provides limited side road access. No additional property is required for the project.

Mitigating Measure:

None.

7.5.4.6 Noise

Potential noise impacts were investigated for the properties adjacent to the right-of-way following Ministry of Environment guidelines and using their computer model (STAMSON) to predict traffic noise levels as a result of the widening.

Noise levels in the backyards of yards of houses adjacent to the right-of-way are predicted to increase in the order of 1-2 dBA following construction. This increase will not be caused by the widening of the road itself but by the additional traffic expected to be using the road. Predictions for 2021 indicate noise levels will increase by up to 4dBA from existing conditions.

Mitigating Measure:

None. While noise level increases are expected with the widening of the road, the increases are not considered to be significant by Provincial standards. (A change of 2-3 dB is considered to be just perceivable to the average person.) Mitigation is normally investigated when noise level increases are >5dB.

7.5.4.7 Bus Stops and Bus Shelters

There are two HSR routes (#26 and #43) with connections to Limeridge Mall on Upper Wentworth Street. As part of the preliminary design of the roadway, HSR provided input as to the type and location of bus stops. Their ultimate location will be finalized in the detail design phase.

The HSR considers bus shelters at bus stops where they will be of the most benefit to boarding customers. Bus stop activity, current/future land use, exposure to weather, amount of available right-of-way, requests from customers etc. are reviewed to produce a list of candidate shelter sites. Sites are ranked using a warrant and a recommended list is brought before Council for their review. Actual installation of shelters is dependent on available funding.

In general, the HSR does not construct bus bays at stops because of the difficulty bus drivers have in merging back into traffic during peak time periods. This can create a need for additional route running time, which can increase transit operating costs.

Mitigating Measure: None.

7.5.4.8 Other Measures

Archaeology:

The extent of archaeological potential, previous disturbances, and extent of previous archaeological investigations will be reviewed by an archaeologist. All areas of potential not previously impacted or subjected to survey will be assessed. Any significant resources located during the survey will need to have development impacts mitigated through avoidance or excavation prior to the start of construction.

Access:

Temporary access to the two commercial properties, for use during construction, is to be established during the detail design phase. Driveway access to residential properties will generally be maintained throughout the construction operations, however, some short interruptions in access are expected during construction. Changes in entrance grades will be minimized and will be determined in the detail design phase.

Soil Erosion:

Standard measures are to be employed during construction to reduce erosion and minimize sediment transport into the storm sewer system.

Waste Management:

Excess materials will be disposed of on site where feasible. Provision will be made for the disposal of surplus asphalt and vegetation material.

Monitoring:

The Municipality is prepared to undertake mitigation measures outlined in this section. On-site inspection will ensure that erosion control measures are effective and that vegetation (trees) identified for protection is not impacted by construction.

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